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Relation of the Better Fabrics Movement to Dyeing

A Premium on Quality Rather than on Price—Improvement May Start with Raw Stock—Elimination of Defects—Water Marks and Other Defects in Fabrics

By GEORGE RICE

THE purpose of the Better Fabrics League of America, which was organized last year in Washington, D. C., is to stimulate interest in the use of finer fabrics for apparel and raise the demands for quality by affording a wider knowledge of raw materials and dyestuffs to all persons engaged in handling textiles. The organization is a chartered one with a definite plan of operation. Already it has arranged with a number of radio stations to broadcast technical talks on fibers, colors and fabrics. It is stated that quality in fabrics is not held at the premium it might be, and perhaps in some respects this assertion is right.

The object of the League is the betterment of fabrics for consumers' use by putting a premium on quality of stock, color and finish, rather than on low prices. This ought to reflect advantageously on the textile industry; for if consumers willingly pay more, manufacturers can give more attention to quality. It will not be so necessary to economize in raw material, dyestuffs or in any of the manufacturing processes to get a reasonable profit for the stockholders if the trade ceases demanding bargain prices on high-grade goods. As a great many trade groups and associations are back of the better fabrics movement, it is evident that its effect will be felt in all textile manufacturing centers.

Presumably mills producing high-grade goods are using the best of materials and employing competent operatives and efficient processes. Just how to improve the character of the materials or the efficiency of the operatives or the processes of manufacture will be a problem for the technical supervising corps of the different plants to work out. A mill running on low-grade goods can easily effect an improvement by reducing the proportion of shoddy or cotton used in its woolens. A dye department which has been coloring a class of goods for which market requirements and prices necessitated the use of low-grade dyestuffs can readily produce better colors by using better dyes.

But the better fabric movement deals primarily with quality worsteds, woolens, mohairs and silks. And how to improve the wearing qualities, looks, finish and colors of goods that are already superior in these details is a question which no doubt will be worked out.

Improvement in Quality May Have to Start with the Raw Stock

When a mill uses the best grade wool from the shoulders and sides of the fleeces to assure strength of staple, softness of feel, uniformity, luster and good dyeing qualities in certain of its high-grade worsteds or woolens, it does not seem possible that that mill can do any better as regards stock. The mill is using the best wool available. We have communications from persons who are interested in the better fabrics movement asserting that no effort will be made to apply the principles of the movement to the wool growers as well as to manufacturers, in hopes that choice wools will be made even more choice and sound in quality. The writer visited several large sheep ranges in California to consult with experienced sheep men on this point. I met with a number of expert wool buyers from the East who were buying wool. With the aid of a magnifying glass carried by one of these men it was easy to see that sheep of the same breed on the same ranch could grow two kinds of wool when foraged and cared for under different conditions.

While the choicest wool of the herd presented a fine, even appearance when enlarged, that clipped from the same parts of the fleece of the pet lambs presented a much finer and evener structure, while its feel was softer and its color whiter. Evidently this wool would

dye, card and spin better than the wool of the herd.

The reason in each case was, of course, due to the fact that the herd ran over the hills and foraged for itself, sometimes exposed to bad weather, often without definite shelter and sometimes quite neglected. The pet lambs of the flock, consisting of the pets selected by the children or for prize exhibition purposes, were regularly fed with the best of sheep foods, always sheltered from storms and climatic conditions, regularly scrubbed and cared for. Their wool was finer, sounder and choicer in quality as a result.

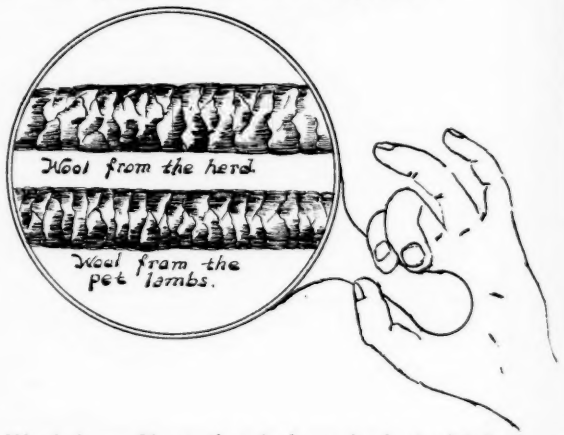
Although it is hardly practicable to give personal attention and care to individual sheep in herds composed of thousands of animals, the pet lamb incident illustrates that it is possible to get better wool from the same breed of sheep on the same ranch by doing so.

If it were done it would about double the price of wool, and, although quality is to be considered before price in the better fabrics movement, a doubling up of prices in any commodity or process of manufacture is hardly contemplated.

Reduction of Defects Will Help to Obtain Quality

If pressure is to be exerted to improve the quality of the wool regardless of additional production costs, it is evident that pressure will be exerted to improve the quality of the finished cloth by reducing defects to a minimum. All efforts will trend in the direction of quality, and not quantity, production, which means higher prices for apparel. We are not concerned with mechanical defects that lower the quality of cloth other than those that occur when the goods are dyed and, not becoming visible until that time, are blamed on the dyer. For instance, the quality of some crepe de Chine hatband fabrics was lowered because of a snowflake appearance on its surface which appeared after dyeing. The fabric was made of raw silk warp and filling, the latter being very hard twisted as is required in this class of goods. During weaving the pull of the sand roller caused the filling to be cut at intervals by the sharp edges of the sand. The filling, being harder twisted than the warp, was less brilliant, so that the greater brightness of the warp threads showed through the cut places in the filling and produced the shining snowflakes. The warp threads were not cut by the sand roll, while the filling threads were at an angle with it. The dyer had to accept the blame for this trouble until he was able to say what caused it, after which the sand rolls of the looms were rubbed down to remove sharp points, the tension on the warps reduced and on specially fine goods the sand rolls were substituted by rubber-covered ones.

Water marks are not very serious on some dress goods, but they can impair the looks of a good serge, particularly if the texture is rather coarse or open. All know that the normal water mark is nothing more than a form of reflection which can be seen by holding the goods in a certain angle of the light. But many do not know that the cause is an uneven flattening during crabbing, and therefore attribute the fault to the dyer, who may have nothing to do with the crabbing process. An excess of tension or pressure will develop water marks in a coarse serge and in many similar fabrics. Hasty or incomplete steaming or cooling will produce a form of water mark that will become apparent in the finished goods.



Wool from Sheep that had received special food, care and shelter was superior in fineness, color and uniformity to the wool from Sheep of the same breed which had not received special attention.

In another case which came to hand, lack of uniformity of the pile of some mohair fabric intended for vests made the color appear blotchy. A first examination indicated faulty dyeing.

The pile was produced with 50% sheep's wool and 50% mohair. But the tufts forming the pile were irregular in the number of fibers contained in them. The dense tufts reflected the most light and consequently looked lighter, although the dyed color was the same as on the less dense tufts. The latter allowed a greater absorption of light, and that made them darker. Hence light and dark places were present in the pile. Cloth can be depreciated in quality by heat creases caused by insufficiently acidified baths, as many a dyer has discovered.

Among other apparel articles tested for raw material, dye colors and finishes of fabrics for quality purposes was fabric for shoe tops of the gaiter type, for the Better Fabrics movement includes shoes as well as hats, gloves, ties and general inner and outer wear for both sexes.

Apparently the fabric was permitted to hang over trestles in the dyehouse for some time in an uncooled conditions, for the creases were of the type usually caused this way. Or they may have been caused when the fabric was wound on to the winch. It is not always easy to determine precisely what produced a fault of this nature.

Streaky Dyeing on Tie Fabric

Considerable viscose rayon is used in neckwear for men now, usually in two or more color effects. Some of this tie fabric which was presented lacked quality because of streaky dyeing. An examination of the texture structure showed plainly that there was irregularity in the thicknesses of the filaments composing the threads, and consequently in the threads themselves. A difference in the absorption of the dyestuffs produced a variation in the depth of the shade of the goods to the extent of a visible streakiness.

The doeskin finish of some very finely woven and heavily felted woolen dress gloves which came to our notice presented a crimpy appearance in spots where tufts of fiber were looped together.

The fabric was woven with a light-colored warp and a dark-colored filling. The crimpy condition extended warpway, being evidenced mostly by appearing darker than the rest. Although the stock was supposed to be fine, some coarse material was present, and these coarse fibers looped themselves at intervals about the fine ones in the thread structure. Miniature tufts of fiber were created, and when a number of these came together the dark, crimpy condition resulted.

The oxidation of unfixed dyestuff on the black in some black-and-gray-checked trousering of wool developed a bronzing condition on the black. It was the usual Sulphur Black trouble that arises when some of the dye fails to thoroughly penetrate the fiber, but instead remains on its surface. The fault may have been caused by the action of a highly concentrated bath, or the yarn may have been left too long exposed to the air between the interval of dyeing and washing it. Most likely too much dye was used, something which is liable to occur if the formula for dyeing is not complied with by actual weighing of the dyestuffs.

Hard water will lay the foundation for bronzing, but most dyehouses are provided with apparatus for softening hard water.

ALLIED CHEMICAL REPORTS NET PROFIT

The Allied Chemical & Dye Corporation and subsidiaries, for the year ended December 31, 1927, reports net income of $24,586,872 after depreciation, Federal taxes, etc., equivalent after preferred dividends to $10.2 a share earned on 2,178,109 shares of no par common stock. After dividends, surplus was $8,768,275, against $11,521,387 in the previous year. Net income in 1926 was $24,072,820.

Current assets on December 31, 1927, totaled $145,721,907, including cash and marketable securities of $102,070,790, and current liabilities were $9,254,643, leaving net working capital of $136,467,264, compared with current assets of $144,028,502, current liabilities of $9,926,087 and net working capital of $134,102,415 at the close of the previous year.

The Rayon Processing Company, Pawtucket, R. I., is reported planning to open a department in which direct and sunfast rayon dyeing will be carried on.

Snowflakes appeared in the crepe hat band due to cut filling.
Streaky dyeing of the rayon tie fabric was traced to uneven absorption of dye by fibers of irregular thickness.
Excessive tension during crabbing produced water-marks in the serge coat.
Lack of uniformity of the pile in the mohair vest made the color appear blotchy.
The doeskin finish gloves were crimpy in spots where tufts of fiber were looped together.
The yarn dyed cloth in the trousers was faulty because unfixed dye stuffs caused bronzing.
Dyeing in insufficiently acidified baths caused heat creases in the shoe top fabrics.

The quality values of cloth are impaired when mechanical defects become the source of faulty dyeing.

Dyeing Fast Vat Colors*

Colors Vary in Properties—The Dyeing Process Counts in Producing Fast Fabrics—Eliminating the Caustic by Chemical Action

By C. E. BROOKES
Sales Manager, Boremco Associates

THE subject assigned to me is not that of dyeing vat volors, but something rather more, that is, the dyeing of *fast* vat colors; and since this is a meeting of the dyers, bleachers, and finishers let us take it for granted that we are speaking of and meaning fast to bleaching.

Dyestuff manufacturers introduced vat colors to the textile trade several years ago, and let us presume that they had one main thought in mind and that was to produce dyestuffs that would stand chlorine, whether it be chlorine in the laundry or chlorine in the bleachery, in addition to boiling soaps, sodas, sours, etc.

In order to dye fast vat colors let us see first what we have to work with. There are three groups of vat colors, sold under many different trade names. In reality they are as follows:

The Anthraquinone Group
The Indigoid Group
The Carbazol Group.

The above groups vary somewhat, and we also find in both practice and theory that different colors in each group and also some in the same group vary in their properties; I mean vary from a standpoint of dyeing temperature, exhaustion, level dyeing, and also fastness.

It therefore seems to me that in order to dye colors that will stand bleaching and to be sure that he (the dyer) is dyeing fast vat colors, it is absolutely imperative that the dyer be very careful in his selection of the vat colors to be so employed, always taking into consideration the fabric to be subsequently produced and decide whether the piece goods, such as "chambrays," have merely to stand the laundry tests or whether he is dyeing yarns that have to go into piece goods such as towels, shirtings, handkerchiefs, etc., that have to stand piece bleaching.

I am somewhat afraid we have been a little too careless. Too many dyers are prone to think they are dyeing vat colors and that vat colors are *fast*. Gentlemen, let me tell you one and all, vat colors are only *fast* when they are dyed *fast;* and I can prove this by the following facts —not facts that I shall give to you but facts I know you are familiar with. Let me ask you, isn't it a fact that you know cases where the same vat color dyed in one plant stands bleaching with no marking off or bleeding, yet that same color dyed in another plant will not stand the same bleacher's process?

*Paper delivered at the spring meeting of the Dyers, Bleachers, Finishers and Mercerizers Division of the Southern Textile Association, held in Charlotte, N. C.

Since in all practice there is the human element involved, processes, like products, will vary somewhat; but even though both the dyer or the bleacher may vary their process from that employed by their neighbors, I do contend that certain basic principles must be adhered to.

All dyers know the general and accepted process or formula for the dyeing of vat colors, and I am not here to endeavor to change the accepted methods. Rather than that, I would feel that my time had been well spent if I could bring out the one little thought or point that might make it more easily possible to do the actual dyeing and to adhere to the regular accepted method at the same time.

We are all agreed that vat colors are dyed approximately as follows, according to formula:

First: *Wet out* or *boil out* the raw cotton, yarns, warps, tubes, or skeins to insure proper penetration, and set the bath at the dyeing temperature with the addition of a little hydrosulphite and caustic soda. Second: Reduce the dyestuff with the necessary chemicals that the formula calls for and add same to the machine. Third: Dye the usual length of time. Fourth: Wash thoroughly to eliminate any excess color and chemicals from the fibres. Fifth: Oxidize by developing or soaping, according to the specific requirements.

Resorting to Chemical Action

Theoretically, the above should give us fast dyed vat colors, and on warps where the washing action is physical and complete I do believe we are safe; but on closed type machines, such as raw stock circulating, package, or beam machines, it is well nigh impossible to get complete washing, because the stock forms a perfect filter. Therefore, where it is impossible to get a real physical action in the washing, there is only one thing left for us to do, and that is resort to a chemical action. Such chemical action, in my opinion, is handled by the addition of a sulphuric acid sour to the wash to absolutely insure the removal or naturalization of the caustic soda employed in the dyeing. This caustic soda must be eliminated by some method before the oxidation is attempted, and where we can't wash it out I say kill it.

In concluding, let me say that all the text books tell us vat colors will stand almost anything in the bleaching process with the exception of a caustic soda boil. Now then, gentlemen, how can the bleacher, no matter what process he uses, boil without caustic soda if it is present in the yarn when he receives the goods? Bleaching of colored striped fabrics is plenty hard enough even when the bleacher knows what chemicals he is using, and almost

impossible if the dyer ships the bleacher fabrics containing chemicals in the colored stripes. We cannot be too careful; washing and souring cost very little. Be sure and eliminate all the caustic soda and hydrosulphite before attempting developing, and remember that old proverb—"A stitch in time gathers no moss."'

Effect of Starch Sizing and Calendering Upon the Physical Properties of a Cotton Fabric

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IN order to determine the effect of starch sizing and calendering upon the physical properties of a cotton fabric, a glazed and an unglazed chintz, of the same rose and green pattern and identical in construction except as to glaze, were analyzed as to weight, thickness, shrinkage, percentage of gloss, yarns per inch, yarn count, yarn diameter and twist, length and diameter of fiber petroleum ether extract, ash, wet and dry breaking and bursting strength, resistance to abrasion and fastness to light and laundering.

Weight of fabric and yarn count were based upon determinations of the dry weights (105° C.) and calculation of the conditioned weight using a regain of 8%. The determinations of petroleum ether extract, water extract and ash were made on approximately 5-gram fabric samples and are expressed in terms of the dry (105° C.) fabric.

All performance tests (each value is the average of ten determinations) were made in an atmosphere of about 65% relative humidity and approximately 70° F.

Abrasion resistance is expressed as the changed appearance thickness and breaking strength following 3,000 double rubs at constant pressure and tension and at the rate of 91 double rubs per minute against a cotton canvas surface (renewed every 1,000 double rubs) in the Wyzenbeek abrasion machine.

The analyses of the unglazed and glazed fabrics are given in the following table:

Fabric	Unglazed	Glazed
1. Weave	Plain	Plain
2. Thickness in inches (2)	0.0067	0.0087
3. Weight in ounces per yard[2] (4)	4.20	4.73
4. Yarns per inch (4)		
(a) Warp	66.6	66.0
(b) Filling	64.0	64.0
5. Yarn count (3)		
(a) Warp	21	18
(b) Filling	23	19
6. Yarn diameter in inches (9)		
(a) Warp	0.0079	0.0085
(b) Filling	0.0076	0.0083
7. Twist of yarn (3)		
(a) Warp		
1. Number per inch	20.6	20.5
2. Direction	Left	Left
(b) Filling		
1. Number per inch	20.2	20.2
2. Direction	Left	Left
8. Crimp ratio of yarn (2)		
(a) Warp	1.05	1.04
(b) Filling	1.12	1.10
9. Length of cotton fiber in inches	0.54	0.58
10. Diameter of fiber in inches (6)	0.00073	0.00073
11. Percentage of gloss of fabric (5)		
(a) New	19.6	79.1
(b) Laundered (1)	17.3	32.0
12. Percentage petroleum ether extract	0.73	0.10
13. Percentage water extract (starch)	4.10	7.53
14. Percentage ash	0.10	0.10
15. Fas ness to light	Fair	Fair
16. Fastness to laundering (1)	Fair	Fair
17. Percentage shrinkage (7)		
(a) Warp direction	2.1	2.1
(b) Filling direction	7.5	5.0
18. Breaking strength (strip method) in pounds (3)		
(a) Warp		
1. Dry	43	51
2. Wet	47	51
(b) Filling		
1. Dry	40	42
2. Wet	45	43
(c) Strength—weight factor (10)	19.76	19.66
19. Bursting strength (8)		
(a) Pounds per inch[2]		
1. Dry	122	93
2. Wet	130	110
(b) Index value of dry fabric	29.05	19.66
20. Abrasion resistance (11)		
(a) Appearance	Worn	No change
(b) Thickness, as per cent of new	106	79
(c) Bucking strength, as per cent of new		
1. Warp	86	98
2. Filling	96	100

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Bleaching and Oxycellulose

Trouble Caused by Bleach Being Too Neutral

Abstract by H. A. Goodman of Work by Clibbens and Ridge, of British Cotton Industry Research Association

THE name *oxycellulose* has been termed an academic cloak of ignorance, or words to that effect. Nevertheless, it is a very real entity to one who has been afflicted with it, for the oxidation of cotton leads to the formation of varying proportions of soluble and insoluble oxidation products which may seriously change the physical and chemical properties of the material.

The insoluble products are covered by the inclusive term *oxycellulose,* which thus represents the results of a variable group of reactions rather than a specific organic compound. Such an expression as "rate of oxycellulose formation" has no definite meaning, but the idea can be expressed in terms of oxygen consumed by cellulose or in rate of change of some property that runs along parallel with progressive oxidation.

The commonest cause of oxidation of cotton in technical work is overbleaching, and if not otherwise influenced the rate of oxidation will depend upon the acidity or alkalinity of the bleach liquor. Normally this range does not include either high acidity or alkalinity. A fresh 1° Tw. bleach made by diluting an 8° Tw. stock bleaching powder solution cannot be more alkaline than 0.004 N or pH 11.5. When put into service, the alkalinity falls rapidly owing to the precipitation of calcium carbonate from the action of the carbonic acid gas of the air and from calcium salts of organic acids. The bath may even become neutral or a little acid.

This change in a bleaching bath may vary, depending upon the kind of goods being bleached. Those from a severe caustic boil, which takes out a great share of the cotton impurities, will not cause so much loss of alkalinity as goods from a milder boil, such as applied when there are colored decorations that are required to stand bleaching.

The hydrogen ion concentration of normal technical liquors varies from pH 5 past the neutral point (pH 7) to pH 10, being usually slightly alkaline. The study of the action was rendered difficult, because during oxycellulose formation acids are formed which may not merely interfere with the conditions of the experiment but actually change the solution from alkaline to acid. The rate of consumption of oxygen was therefore measured in the presence of buffers to stabilize the hydrogen ion concentration, in solutions of sodium hypochlorite corresponding to bleach of ½° Tw. It was found that strongly alkaline solutions (pH 13) acted very slowly and that strongly acid solutions (pH 1) which corresponded with the liberation of free chlorine acted rapidly. At moderate values of pH on either side the rate was intermediate, but at the neutral point (pH 7) the solution was extremely active, ten times as rapid as at pH 9 or pH 4.6, respectively, moderately alkaline and acid. Check tests confirmed the finding that bleach is most active in exactly neutral solution.

The result was checked also by copper numbers, Methylene Blue absorption and viscosity of the dissolved cellulose, in all of which tests the most rapid change was shown for cotton treated with neutral bleach.

The effective oxidizing agents are hypochlorite ion at pH 9 and hypochlorous acid at pH 4.6. The rapid action in neutral solutions can only be explained by the presence of high concentrations of both at once.

The commonest cause of overbleaching in technical practice must evidently be the injudicious use of hypochlorite solutions within the danger zone very near the neutral point.

JAPAN TO APPOINT COMMITTEE ON GERMAN DYE IMPORTS

Osaka, Japan.—The recently concluded commercial treaty between Japan and Germany, after pending for some time, has been ratified, according to the best informed Japanese press. It is understood that the treaty provides for appointment of a committee to decide on limits to be placed on the dyestuffs, about sixty-five in number, on which importation from Germany will be restricted.

The committee will be made up, it is understood, of representatives from the Japanese Government commerce department and foreign office, and German and Japanese producers and consumers. The first two will be represented by the director of the industrial affairs bureau and the director of the commerce bureau; the Germans by the Doitsu Senryo Kabushiki Kaisha, and the Japanese producers by Mr. Inahata Katsutaro.

For consumers the woolen, silk and cotton textile interests each desire to obtain a seat on the committee, and a compromise is being proposed to them. A body of consumers organized under the name of Senryo Kyogi-kai, or dyestuffs council, might be organized, it is suggested, and to it be left election of a member to represent their interests, so that the representative thus elected would be able to voice their opinion. The proposal appears to be gaining support among the consumers.

Dr. E. A. Hauser, British chemist, has been appointed non-resident associate professor of colloid chemistry at the Massachusetts Institute of Technology, where he will deliver his first course of lectures on applied colloid chemistry with special reference to rubber, during the summer term.

Initial Treatment of Burns of the Eye

Experimental Knowledge of the Subject—What Authorities Advise—Treatment of Second and Third Degree Burns—Illustrative Cases

By PAUL BARTHOLOW, M.D.

THE article on the "Initial Treatment of Chemical Burns of the Eye," in AMERICAN DYESTUFF REPORTER, page 596, 1927, though timely and interesting, does not entirely agree with actual experience. It may also be doubted whether there is anything new in the treatment advised. We all know the value of the rule that burns, whether of the eye or any other part of the body, if they are more than superficial, must be treated as quickly as possible, and that water is not only a convenient remedy, but one that commends itself to common sense, but authorities differ as to its proper use. Few, I imagine, who have ever had any Red Cross experience, would agree to this assertion by the author, W. B. Hubbard, M.D., of the Henry Ford Hospital, Detroit: "Delay in first aid treatment of chemical burns of the eye must be avoided. *Any available solution,* which is not harmful in itself, is of more value immediately, than any other treatment in five minutes."

I should be sorry to think that "any available solution, which is not harmful in itself, is of more value immediately, than any other treatment in five minutes." However, I do not know what the author means by "any available solution not harmful in itself." And who is to decide this nice question in the hurry and confusion of a really serious accident?

The experiments on which the author bases his conclusions are not like actual conditions. A fair summary of our experimental knowledge may be found in "Industrial Poisons in the United States," by Alice Hamilton, M.D., who writes: "The public should be taught that the best first aid to injured eyes is, as a rule, to let them alone, apply a clean cloth bandage, and seek a physician, except when large quantities of foreign material, chemicals, etc., have entered the eye; then first treatment is free douching with cold water." In burns of the eye the American Red Cross Textbook says: "Wash as quickly as possible with water, and then with lime water."

Down to a very recent date washing the eye with water, or with a boric acid solution, has been the practice in Red Cross and hospital work *for superficial burns*, and it does not require any experimental evidence to convince us that this treatment is sufficient for simple cases. But it does not take us very far. How are we to treat second and third degree burns of the eye, in which there is immediate destruction of the cornea, or iris, in which the poison diffuses through the cornea and conjunctival sac? We cannot find sufficient answer through experiments which describe pre-arranged conditions. The author says: "Experiments were done on rat eyes with nitric acid 20 per cent and sulphuric acid 50 per cent," and his conclusions are: "(1) neutralization followed by washing resulted in more serious damage than with washing alone; (2) the results were very similar to those obtained by neutralization alone, and (3) neutralization before irrigation was harmful, and it was of no benefit afterward."

What Authorities Advise

Let us survey what was done during the war, and what all authorities commend as the best treatment for burns of the eye. How admirably does a great authority say: *"Nach der Art der Verletzung ist die Therapie in eine Lokale und allgemeine einzuteilen und keine von den beiden verdient von de randeren den Vorgang"* (According to the nature of the wound the therapy is to be divided into local and general, and neither deserves to be ranked before the other. Vienna Hospital in Brun's Beitrage, and Verbrennungen im Kriege, Ergebnisse der Chirurgie, 1920, p. 165). It is an error of the gravest kind to leave us in doubt, as our author does, whether he is speaking of burns of the first, second or third degrees. No sane man, who has had any experience, would treat a burn of the second degree with water alone; and in superficial burns would he, in freezing weather and at the scene of a great fire, use tap water as a means of irrigation? In confounding burns of all degrees under a one common head, the author loses sight of an important distinction.

No one with any real experience could be ignorant of the fact that when the papillae and nerves are exposed water alone is extremely painful, and, if there is shock (as there usually is in any case requiring treatment), pain increases the patient's prostration. In fact, some eminent surgeons, as Lejars, in his Chirurgie d'urgence, for instance, treat shock first of all. Again, anyone with chemical knowledge is quite sensible of the fact that in acid burns of the eye, water is a *neutralizing agent* (*"Hierbei genugen zumeist zur neutralisation reichlichen Spulungen mit reinem Wasser,"* Weyl, Handbuch der Arbeiter Krankheiten, p. 773; Arbeiterschutz, 1926, p. 89; Zeitschrift fur Rettungswesen, 1924, p. 151).

It must be confessed that up to very recent times treatment of burns of the eye has been very unsatisfactory. Here is the advice generally given (See Safety Enginering, September, 1927): "On slight burns employ common baking soda dry, or dissolved in water in a paste." For shock, the Red Cross, in the writer's experience, employs aromatic spirits of ammonia—a remedy which Prof. Cushny found absolutely useless in the field. Some

authorities (American Encyclopedia of Opthalmology) say: "In treating a patient (with eye burns) the condition of shock must be attended to first, since from it arises the primary danger. The sufferer must be wrapped immediately in hot blankets, and brandy given." In prewar times both brandy and morphine were given in cases of shock, but we have learned by hard experience that the first may cause excitement, even delirium, and that the second may be dangerous.

What Shall We Do in First and Second Degree Burns of the Eye?

During the war I was made acquainted with two solutions, doubtless of very great value, but already partially superseded—Dakin's sodium hypochlorite solution and Burow's solution of ammonium acetate and alum thus:

Aluminum acetate	10
Alum	5
Distilled water to	500

A very weak dilution of this solution, 1:100 is certainly very soothing, but I think Dakin, whom I knew and who never had any practical experience, I believe, must have based his views on purely theoretical considerations. So far as I know, his solution has given way to one which is now regarded as the best, almost the ideal one—*the isotonic or a* 0.9 *per cent salt solution.* Every mill should have tablets by which solutions may be prepared at once and workmen should be taught to use them, and to avoid some errors in the application of other means, which may be very well in their place, but which should not be abused. The value of the isotonic salt solution was established during the war, and it depends to a very great extent upon another lesson also learned by surgeons of different armies, namely, that the blood serum is at once the most natural of antiseptics and the most healing of natural agencies. Besides which its action is an effect of physical causes, and not the result of empirical observations. In the most recent, and certainly the most exhaustive of studies on this subject by Mauritz Person in the Swedish journal, Hygiea (1926, p. 842), he writes: "According to the general or usual laws of diffusion, the serum is strongly withdrawn from the blood vessels by the action of isotonic salt solutions. If we raise the osmotic pressure, i. e., by employing a hypertonic, or 7.7 per cent solution, the diffusion is even greater." This solution, however, may be painful.

I thing everyone who has had much experience in treating burns of the eye must acknowledge that washing with sterilized or tap water is very painful, and increases shock (See Bruns, Beitrage zur klinische Chirurgie, 1912, Vol. 81, p. 61). Prof. Fratin has published in the Policlinico, 1915, Sez. Prat., p. 721, his results with isotonic salts solutions which he prefers both for simplicity and speed, to any of the other remedies. They have taken the place of weak solutions of picric acid which recent investigations have shown to be too irritating for burns of the second degree (See Annali di medicina navale, 1911, XVII, p. 223). Evidently picric acid had had its vogue, and been passed over for more scientific agents.

The author whom I am citing makes no distinction between burns by sulphuric and nitric acid. The distinction—and its relation to treatment—are well brought out by a writer in Safety Engineering, September, 1927: "Nitric acid burns are different from sulphuric acid burns—they are more like actual burns." And, "to destroy the burning qualities of an acid, it is necessary to neutralize it with an alkali. As sulphuric acid takes up water in all proportions with great evolution of heat, it is very dangerous to throw water on it."

Illustrative Cases

However, I can supply some instances in which the author's experimental conditions were fulfilled in actual practice. One case is described by the celebrated French ophthalmologist, Darier. A man was cruelly burned on the cornea with sulphuric acid. Washing with water was carried out almost immediately, but there was no result, because the burn was too deep, and the pain was so great that the patient was in a state of shock. Powdered anesthesin was applied with immediate relief. (See Clin. Ophthal., 1903, 327).

Two questions arise here: Should our first step be to relieve pain, and, if so, is anesthesin the best remedy? I have always found it most useful when a powder or salve was needed, and a 2 per cent solution of alypin will stop the pain of a nitric acid burn, as I have seen in scores of cases, but this remedy is not obtainable, I believe, in this country. The second question is: Should we employ any remedy to relieve the pain? Writers like our author do not pay much attention to pain; they belong to a new school which have a mistaken dread of anodynes, and believe that pain is a benign symptom.

The following case is an illustration of the necessity of neutralization: An engineer, H. W., while heating $CaCl_2$ received a quantity of the salt in a nearly dry state in both eyes. He was *immediately* taken to the tap, and the eyes were thoroughly washed out with the running water. Irrigation with water, however, *did not remove the salt from the eyes.* They were then bathed with physiological salt solution, which produced an effusion of serum and fluid, thus washing out the calcium chloride. A salve of orthoform was applied, and the result was that both eyes became normal. (See Verbrennungen der Augen durch Chlorkalzium, Monstablatter fur Augenheilkunde, Vol. 72, 1924, p. 137.)

In another case, in my own experience, a workman was severely burnt about the eyes and head through the bursting of a pipe carrying soda lye. His fellow workmen used that favorite—a solution of sodium bicarbonate—which greatly increased the man's agony. The only remedy at hand was the vinegar bottle on the lunch table,

(*Continued on page* 299)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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MARCH MEETING OF THE RHODE ISLAND SECTION

The March meeting of the Rhode Island Section of the American Association of Textile Chemists and Colorists was held on Friday evening, March 16, 1928, in the rooms of the Providence Engineering Society.

Arthur K. Johnson, of the Lowell Textile School, presented an interesting address entitled, "A Discussion of the General Application of the Microscope to Physical and Chemical Problems of the Textile Industry."

Mr. Johnson exhibited some very interesting pictures in connection with his speech.

Fifty members were present.

ALBRO N. DANA, *Secretary.*

APRIL MEETING OF THE RHODE ISLAND SECTION

The April meeting of the Rhode Island Section of the American Association of Textile Chemists and Colorists was held on Friday evening, April 6, 1928, in the rooms of the Providence Engineering Society.

Dr. Elvin H. Killheffer, President of the Association, addressed the meeting in regard to the establishment of a larger textile research fund. This address follows.

The second speaker of the evening was W. W. Bray, of the Procter & Gamble Distributing Company. The subject of Mr. Bray's address was "Soap Problems in the Textile Industry." Mr. Bray is in charge of the service work at the Ivorydale factory of the Procter & Gamble Distributing Co. His address is also published below.

Sixty-eight members were present.

Chairman Hutton introduced Dr. Killheffer as follows:

Chairman Hutton—We are honored this evening by the President of the American Association. Many of the older members remember Dr. Killheffer when he was here before and gave us a very interesting talk on China. You younger men, or rather newer men, have not had the opportunity to meet him as yet, and I am going to ask him to give us a little talk on the aim of the Association and what he wants us to do to help him out.

A Technical Bureau for Research

By DR. ELVIN H. KILLHEFFER
President of the American Association of Textile Chemists and Colorists

I REALLY came to visit rather than to talk. I will say what I have chiefly on my mind at the present moment, and will not take too long about it, because you

have probably read in the proceedings of the Association what I had to say about it before a meeting of the New York Section. However, for the benefit of those who haven't read those remarks, I will review it very briefly. Some time back the Council appointed a Finance Committee to raise funds to carry on further research. Just exactly what that research was to be was more or less hazy. What we have done so far is to attempt to standardize methods of testing for fastness. A good deal of work has been done by the Research Committee, and in the last year the Association has sent a Research Associate down to the Bureau of Standards. He has been working entirely on problems pertaining to washing fastness and light fastness.

If we are to go out and raise some money we realized at once that we would probably be in the category of beggars or seekers after charity. We therefore wanted to conceive an idea that would be sufficiently large and of enough value of itself that we could go out and sell it rather than beg for funds.

That led finally to the idea of creating for and in the name of this Association a Technical Bureau and laboratory patterned after similar bureaus and laboratories in Europe. This idea recognized that the textile industry in the United States has been in the past noticeably backward in fundamental research. With a large and powerful textile industry as in the United States there is plenty of room for a Technical Bureau and laboratory such as we have conceived.

To describe it briefly, it would be necessary to set up in New York or some similar point a Technical Bureau and laboratory. It would be necessary to have it equipped with everything in the way of apparatus and machinery that would be needed for use in investigational and research work in the textile industry and a personnel of the very highest caliber that could be obtained to put it on a high plane so that it would command the respect that such an institution should have.

How the Bureau Would Benefit the Industry

There would be a great deal of non-productive work which would be for the benefit of the whole textile industry. In this non-productive category we shall put, for the time being, pure, fundamental scientific research research. No one would know how soon that would be changed from the non-productive to the productive side of the ledger. Beside the fundamental research there is a great deal of work for the benefit of the whole industry at large that could be handled by this Bureau but that would not be productive of income. For some more complete outline of this work I would refer you to my address before the New York Section, which has been previously published.

On the productive side would be a lot of activity that is now being handled by different laboratories and private institutions. There would be all kinds of testing for department stores; acting as umpire in various disputed cases; certification of the fastness of various textiles put out by certain manufacturers, which is something that has not only been neglected in the past but has met with a great deal of opposition, for the retailers apparently don't want trade-marked merchandise or merchandise marked in the selvage. Apparently it presents difficulties when they want to substitute with something cheaper made here or imported.

You can get what I am driving at regarding productive work and non-productive work. We now come to the part that is very important at the present moment. If such a thing is to be put over by the Association, it must be put over in a large way so that people here, there and everywhere can't point to it as a half-hearted effort or something done in a cheap, imitation sort of way. It has got to be done right—from start to finish. To do it right requires a lot of money. The figure that I have in mind right now is one million dollars. One million dollars would provide an income of, roughly, $50,000 a year.

The way I would like to see the $1,000,000 raised is to sell the idea to 1,000 textile manufacturers for $1,000 each, then you have $1,000,000. I would like also to procure these donors as corporate members of the Association for $25 a year, each equaling $25,000 income per year. We would probably take in another $25,000 a year for some of the revenue-producing work mentioned. If all of the above could be realized we could then have approximately an income of $100,000 per year, and with this amount of money I am very sure that such an impressive showing could be made and that many times that amount would soon be forthcoming from the textile industry, which would be the beneficiary of any accomplishments of the Bureau.

One thousand donors at $1,000 each sounds like a big undertaking, but it really isn't. For the sake of comparison I can tell you that in the American dyestuff industry the amount expended for research equals approximately 4% of the total sales value of our productions and this percentage is over a period when a good deal of our research has been simply finding out how to do what someone else in the world already knows, so that undoubtedly from now on, as we will be engaged more in original research, the percentage figure will in all probability be higher.

Now, in the much larger American *textile* industry, if it were possible to raise a fund equal to 0.1% of the total sales value of their goods you would have available a fund of about $2,750,000 per year. I make this comparison only so that you can see that when we ask for $1,000,000 we are really asking for a very small amount

of money as against the very important work that we contemplate doing for the whole industry. As a matter of fact, we feel very positive that if 1,000 textile manufacturers should subscribe $1,000 each they would soon find that they had made a very good investment indeed.

That is the idea we have in mind. Some of us have devoted a lot of time to it so far. I for one am perfectly willing to work hard on a problem where there is some chance of success. We realize at the outset that this idea falls flat if it cannot be sold to the textile industry. Therefore, my circulating around and talking about this specific thing is to feel the pulse of the Association and get an expression as to what you think of the idea and what you think of the probability of putting it over, and what objections and criticisms you can offer against the idea itself.

Value Would Accrue to the Industry

You, of course, realize that I personally have plenty to do without working on this problem. If this idea would go over at all you realize that the whole value would accrue to the textile industry. So if there is something wrong with the idea, if you think we cannot sell it to the industry, we would very much like you to express yourself and to have the firms with whom you are connected also express themselves as to what you and they think of the whole proposition, because on such an expression depends largely what we, as an Association, will do about it.

We have put in a bid for some of the Textile Alliance money. I don't know that there are many institutions who haven't put in a bid for some of the money. All we would like to have is $100,000. That $100,000 would go a long way in the original creation of the Bureau. We believe we could do a pretty good job. If we can get our $1,000,000 we would be off to a very good start. All I have been able to get so far, with one exception, in talking this idea up, is, to date, eight applications for a position in the Bureau when it is founded. That, I think, Mr. Chairman, is all I have to say. If some of you members want to express yourselves on this idea I would be most happy to hear from you.

Discussion on the Technical Bureau

Mr. Lustig—I am speaking as a member of this Association. It might be good and much easier for those who haven't much money if you could fine each company a certain amount of interest or a tax. You say you are spending now about 4% of gross sales for research, which is comparatively a tax we pay as the consumers. We would pay for it just the same. Doesn't it strike you as a possibility?

Dr. Killheffer—In answer to your idea, I may say that the 4% to which I refer is naturally included in our costs. That doesn't mean, however, that the textile industry is paying that 4%, except as any purchaser of any article naturally pays for the original cost of the article.

I am very sure you will find that if the textile manufacturers themselves want this Bureau and will support it financially, the dyestuff manufacturers will be ready and willing to do their part toward its financial support, even though they have tremendously heavy problems of their own along this same line. Furthermore, if we cannot sell the idea to 1,000 textile manufacturers for $1,000 each, then, to me, that simply means that the textile industry, as such, does not approve of the fundamental idea; and, of course, if that is the correct conclusion finally arrived at, then naturally we shall drop the idea.

Mr. Lustig—I agree with you and I am very willing to come in, but I think many would hesitate.

Dr. Killheffer—I agree with you that a good many would hesitate, but they shouldn't. If the thing is done right the results would pay manifold that $1,000 investment.

The Dye Manufacturer's Interest

Mr. Lustig—I am not starting a discussion. It should be splendid to broadcast the idea over the entire industry. The dyestuff manufacturers, however, are self-interested.

Dr. Killheffer—There is less direct interest for the dyestuff manufacturer than there is for the textile manufacturer. The dyestuff manufacturers could not look to such a Bureau for their research. The dyestuff manufacturer has a pretty definite problem before him from now on in that most—but not all, of course—of the important things have now been fairly well covered. If we, the dyestuff manufacturers, progress in the way of original research, our research bill will most probably be in excess of what it has been in the past. That also is a guess, but a reasonable one.

The dyestuff manufacturer, I feel sure, will do his part; but this is decidedly not a dyestuff manufacturer's idea, nor does he anticipate any direct benefits from it. If the Bureau is set up and does the work that is now visualized the benefits will be entirely for the textile industry; assuming, of course, that there will be some actual accomplishments, and I believe that all of us are agreed that this is a reasonable assumption. To the extent that the dyestuff manufacturer's prosperity is bound up in that of the textile manufacturer, some benefits will indirectly accrue to the dyestuff manufacturer, but in no other way.

Let me add one more thought, which is this: In my opinion, under the present methods of marketing of textile goods, the textile manufacturer who makes a good fabric and puts on it the fastest colors and a good finish is in many cases at a decided disadvantage, because with-

out a branding of his material or a particularly marked selvage, if you please, his identity is lost long before the goods reach the actual consumer, whether it is bought over the counter by the yard or whether it is bought in the form of made-up garments. Under the present system of merchandising it becomes very easy for someone who handles the goods after they leave the manufacturer to substitute cheaper and more or less imitation fabrics, whether made here or imported. Most purchasers over the country would gladly pay the slight advance necessary for fast-colored fabrics if they were sure they would get what they were paying for. The only way they can be sure of this is for you to have branded or certified fabrics, whether in the piece or in the garment, and this is something easy of accomplishment through the proposed Bureau. This is not propaganda for fast colors. It is, however, a plan under which the ultimate purchaser of textile materials can exercise an intelligent choice, buying fast-colored fabrics, fabrics of medium fastness or of lesser fastness, whatever may be the particular need in the particular case.

Research Laboratories in Other Industries

Member—I want to say that it is high time everybody connected with the textile industry should really take up this idea. They are not keeping pace with others if they don't. I might mention two or three outside that some of you know about. There is the lithographic paper manufacturers' foundation. The litho-paper manufacturers raised $750,000 about two or three years ago, and I am sure that the whole textile interests are very much broader than the paper lithography.

Some of you know that the leather manufacturers have a beautiful laboratory on the grounds of the University of Cincinnati, and the particular thing I want to mention about that is that no manufacturer or personality is financially interested in the laboratory. It is strictly free. Their work is published freely everywhere and is available for everybody. The textile industry is much larger than the newsprint industry, which supplies $50,000 every year to support research and has built a beautiful laboratory in Montreal; the gentleman who occupies the chair there is Professor Hibbert. I feel the importance of research work by this industry; and as you say we, as chemists, cannot furnish that amount of money; but for the textile manufacturer it is a question of going out of business if he feels that he cannot afford it.

Mr. Hutton—Most of us here are identified with the textile industry, and $1,000,000 taken from the textile industry as a whole isn't such a tremendous amount and I think it is well worth thinking about.

Soap Problems of the Textile Industry*

By W. W. Bray
Procter & Gamble Distributing Company

NO one will deny that the textile industry, by the very nature of its processes, faces problems of a varied and peculiar type in connection with the use of soap. At least one indication of the prevalence of such difficulties is the frequency of complaints of one sort or another directed toward the soap manufacturer. Upon investigation, the large majority of such complaints are resolved into two classes: First, unwise choice of the type of soap for a particular job, and, second, lack of information concerning the nature of soap and its relations to the rest of the materials employed in textile processing.

This scarcity of knowledge, which not infrequently amounts to positive misfortune regarding soap, is widespread among consumers of soap and so is not confined to the textile industry. But the delicate nature of the materials handled and their intrinsic value, especially in the silk and woolen branches, emphasize the importance of an understanding of the action of soap and its bearing on the quality of the finished product. At the present time, however, such a realization is to a great extent lacking and the results are often incongruous and occasionally absurd. If trouble is encountered in a process in which soap plays a part, the tendency is strong to blame the soap, without regard for numerous other factors often of an operating nature, and any one of which might easily be and usually is responsible. Thus the blame is mislaid and faults badly in need of correction continue to exert their ill-effects.

Even among technical men, the characteristics of soap are less well known that those of most other materials handled—for example, dyestuffs. For this condition is responsible, first, to a lack of relative interest. Soaping operations have been considered as preparatory steps and comparatively of secondary importance. The true value of a correct preparation has not, perhaps, been realized. Lack of time for sufficient study also contributes. Pressing problems in more obvious lines have demanded and received attention. Third and perhaps the most unfortunate is the appalling scarcity of reliable information in the scientific literature. Few experimenters have tackled the physical relationships underlying the behavior of soap solutions, and a far smaller number have made any attempt to study their application to textile processes. Even among these, disagreement is general and the dependability of results is frequently called in question. McBain, who with his co-workers has developed a mass of valuable and accurate data on the physical chemistry of soap

*Address delivered at the meeting of the Rhode Island Section of the American Association of Textile Chemists and Colorists held April 6, 1926, in Providence, R. I.

solutions, points out, for example, the extreme caution necessary to avoid error introduced by carbonization of the soap by the CO_2 content of the air.

Soap is a substance by no means simple in constitution or in behavior. Even so apparently simple a problem as the explanation of why soap washes is still subject to wide disagreement and much controversy. There is, however, a considerable body of facts from which certain conclusions can be drawn and interpreted in relation to the processing of textile fibers.

The Functions of Soap in Textile Processing

A survey of the operations involved reveals three distinct functions which soap performs in its application to textiles:

1. Detergent action, involving washing, scouring or cleaning in general.
2. Hydroxylon action, confined to degumming milk.
3. Finishing, including fulling.

The first problem that arises in connection with any of these uses is the choice of the correct soap for each one. Heretofore the selection of soap has been based largely on prejudice and not on any scientific study of the needs of any particular job or type of material. The differences in the work a soap is called on to perform might seem to indicate that the nature of the process would determine the choice of soap. On the contrary, we find in the majority of cases, when dealing with the animal fibers silk and wool, that this is not the case. The important factor in the selection is the relation of the soap to the fiber.

This conclusion was arrived at after a recent analysis of the properties desirable in a filter or fabric after treatment with soap, combined with an extensive study of various soaps to determine what characteristics of the soap influence the desired result. Silk and wool, closely allied in chemical constitution and sensitivity to various reagents, were considered from the point of view of retaining or augmenting their natural qualities of strength, luster, handle, and so on. Soaps of extremes and medium types, from stearates to oleates, including intermediate mixtures, were tested to learn their effects on these qualities of the two fibers.

One fact was immediately apparent, namely, that so far as concerned what was considered the primary purpose of any individual process we have no decisive basis of comparison. In other words, in degumming silk, both the stearate and the oleate will completely remove the silk gum. Tallow, red oil or cottonseed oil soaps will emulsify wool fat in a satisfactory manner. But in judging the final result, whether of boiled-off silk or of scoured wool, the accomplishment of these so-called primary functions cannot be differentiated from the effects of various "side reactions." And it is the side reactions which count. Silk may be freed of sericin to just the proper point and yet be valueless if meantime it has been harshened or chafed. Wool, nicely cleaned of its wax and dirt, may have been greatly depreciated if excessively tendered or if left with a strong soap odor. It is impossible to avoid the conclusion stated above, that the important factor in choosing a soap is the relation of that soap to the fiber.

As a result of this analysis, there was established a scale or set of standards according to which any soap may be judged for its value in the treatment of silk and wool. The items in this scale are the characteristics that a soap must possess in order to be entirely satisfactory for textile use. They are listed as follows:

1. Solubility.
2. Degree of hydrolysis.
3. Degree of preferential absorption.
4. Stability of fatty acid emulsion in presence of acids.
5. Rinsibility.
6. Stability toward oxidation and reacidity.

Why Solubility Is an Important Factor

An easily soluble soap is most desirable since it reduces the time, labor and steam consumption necessary to put it in solution. Also, concentrated solutions of the soap can be kept and handled in a fluid state without the necessity for keeping hot or of melting from a solid jell condition. The form of the soap likewise has much to do with its solubility. A solid or bar soap is much slower to dissolve than the same soap in uniform, fairly thin flakes. Naturally, an oleate is far superior to a stearate in solubility.

The extent to which a soap hydrolizes is a measure of its detrimental action on the delicate fiber. The hydroxylion liberated combines with the fibroin or keratin, as the case may be, with the usual effects of this reaction in reduction of strength, dulling of luster and increase of harshness. Since oleates are much less hydrolyzed than stearates their depreciative effect on the fiber is less. This partially explains the trade preference for low titer soaps like olive and constitutes an advantage for a soap of still lower titer.

The combination of the hydroxylion liberated by hydrolysis with the silk or wool substance has been termed "preferential absorption." Therefore this item depends on the degree of hydrolysis for a particular soap. Accompanying the absorption of the alkaline fraction of the soap, there is a corresponding deposition in the bath of fatty acid, or more prob-

ably, acid soap. In either case, this formation is doubly undesirable, since it acts like dirt in cutting down the efficiency of the liquid, and tends to deposit on the fibers from which it is extremely difficult to remove.

The extent of this absorption may be observed by steeping samples of wool in soap solution for a time. A solution of tallow soap used for this purpose will soon become very cloudy and opaque, while that of a very low titer soap will remain practically clear. This further emphasizes the advantage of the latter type of soap for processing such textiles.

In many cases treatment with soap is followed, after more or less rinsing, with an acid bath, such as an acid dye bath for silk or the carbonization of wool. Any soap present in the goods, as there will be to a small extent in any case and in greater amounts if rinsing has been slighted, will be split by the acid and its fatty acid liberated. If the fatty acid has a strong tendency to agglomerate, there will result trouble from oily spots on the yarns or pieces. On the other hand, if the fatty matter is easily emulsified it will remain in finely divided condition in the water and give no trouble. High titer fatty acids agglomerate rapidly. Those of low titer, like oleic acid, remain in emulsion as formed and give the operator an extra factor of safety against oil spots.

Troubles That Follow Poor Rinsing

One of the most important phases of the use of soap is that of its removal after its work is finished. Failure to rinse thoroughly can be responsible for more troubles than any other single fault in its use. Soap remaining on the fibers is objectionable, since it reacts chemically with most of the materials used in later processes, with the formation of extremely troublesome compounds. Acids decompose soap to fatty acid, aluminum chloride for carbonizing forms sticky, insoluble soaps, chrome mordants and tin tetra-chloride (tin weighting) have the same effect. The only sure way to avoid these manifold ills is to remove the soap by rinsing. But this is often difficult or next to impossible to accomplish. The low temperature at which the operation must usually be carried on greatly handicaps rinsing. Not infrequently the water is applied unheated. Production requirements tend to limit the time, and economy the amount of water. What is wanted is a soap that needs the least effort for its removal. Thus we find that rinsibility is closely coupled with solubility and also with titer. The lower the titer the more rapidly and thoroughly the soap rinses.

A further factor that depends to a great extent on rinsing is that of the development of odor in the treated goods. An amount of soap that is too small to give trouble in any other way may become rancid and impart a strong and undesirable odor to the material upon which it remains. Rancidity is a direct result of the use of a poor soap stock, followed by storage under warm and moist conditions. Stearates, of course, are the least likely to become rancid of any soaps, but oleates will cause no trouble of this sort under any but the most unreasonable conditions. Where real difficulty arises is in the use as soap stock of the fatty acids more highly saturated than oleic, such as linolic or linolenic. The so-called drying or semi-drying oils contain substantial amounts of these acids, which, if remaining on fabrics in soap or free form, not only rancidify but also dry and harden, imparting a sticky feel to the goods. It is for this reason that cottonseed oil and corn oil, to name two common adulterants, are undesirable soap stocks.

From the foregoing, then, it is plainly evident that no matter what the duty, at least within the fields of degumming and scouring, the best type of soap that we can use is that which approaches most closely the oleate in composition. As practically determined in the ordinary soap analysis, this means that the lower the titer the better the soap for textile processing.

Potash vs. Soda Soaps

There is one more problem which the wool man faces in choosing his soap. The industry still labors under the tradition that potash soaps and alkalies are superior in effect to the corresponding soda products. Many have come to realize that this is nothing more than a legend, without present-day basis in fact, but here are yet some who cling tenaciously to the old idea and to whom very definite proof must be presented before they will think of changing.

The tradition doubtless originated in the day when potash soaps were all that were available and when the introduction of soda soaps was resisted because of their novelty. Furthermore, there doubtless is the advantage of better rinsing when using a potash soap of the higher titered stocks, such as grease or tallow, as against a soda soap of the same stocks. But in these days of first-class low-titer soda soaps and expensive potash, there is no real excuse for the use of the potash type.

In order to get really comparable data on the characteristics of soda and potash soaps, a long series of tests was made using both soda and potash soaps of an oil with a titer of 12° C. Solubility, hydrolysis and preferential absorption, rinsibility and tendency to rancidify were compared. The results, considered from an unprejudiced attitude, prove conclusively that the potash soaps have no superiority of any kind over the soda product.

The potash soap was, of course, slightly more soluble, but the solubiilty of the soda soap was so great as practically to vitiate any possible advantage. It is evident that

a soda soap possessing, as did this one, a solubility sufficient to keep a 30% solution liquid at room temperature passes beyond the range of industrial necessity or capacity for utilization.

Potash soaps have been known for some time to be more highly hydrolyzed, although the difference is but slight. Correspondingly, a small but quite definitely greater absorption was found. In this regard, then, the soda soap is somewhat better.

Comparison of the rinsing qualities of the two showed again, despite the greater absolute solubility of the potash soap, that the soda soap led by a very small margin. This point was considered the stronghold of the potash soap and it was really a little surprising to find the soda product showing up so well.

Finally, in tendency toward rancidity, it seems that the potash soap is considerably more dangerous. Two cans of flaked soap, exactly similar except for the difference in alkaline base, were stored under warm, moist conditions. After about three months, the potash showed definite traces of rancidity and at six months was far advanced. The soda soap, meanwhile, remained perfectly sweet during the entire time.

From a different angle, that of their relative effects on the tensile strength of wool fibers, Dr. Chapin, in a work well known to most of you, has determined that soda and potash alkalies (carbonated) are practically equal.

Hence we see that there is actually no case at all to be made for potash soaps. With proven equality, exemplified in the case of the two low titer soaps, there is no argument from the standpoint of better quality, and with the large differential in cost favoring soda soaps, economy demands their exclusive use.

How Hard Water Affects Processing

In discussing the selection of soap we have referred briefly to a number of points in connection with various processes concerning which further detail may be interesting.

Hard water is a constant or continually recurring source of trouble in the textile mill. Without going into detail concerning their nature, it is worthwhile to remark that hard water is frequently responsible for difficulties of which it is not recognized at the source. The surest remedy for hard water is the installation of a zeolite softener. Often, however, when these are present lack of proper attention allows some hard water to get by from time to time. Lacking such a system, the best method of avoiding trouble is to soften the rinse water before entering the goods so that the formation of lime soap as curds is avoided. This is done by adding to the rinse water a sufficient quantity of a 10% solution so that a small sample withdrawn and shaken in a bottle gives a fairly permanent suds. The lime soap formed is emulsified and kept in a fine state of subdivision so that it cannot curd out and stick to material being rinsed. The amount of soap added for the softening should be carefully watched as above; too little will permit curds to form, too much cuts down the rinsing efficiency.

One of the most interesting of all applications of soap is that of its use in degumming silk. Here there are involved two entirely distinct functions which the soap must perform and one of which is unique in being confined exclusively to this particular work. The first function and a minor one is of a detergent nature; that is, the emulsification and removal of the throwster's oil or other compounds, which are present on the silk. This, of course, presents the usual problem of scouring and is not of major interest at this point. The main purpose of the soap is to remove the coating of silk gum covering the silk fiber. This is accomplished by the soap by means of the hydroxylion liberated when the soap is put in solution. Silk gum is not at all susceptible to removal by the conditions of scouring such as treatment with a dilute soap solution at a temperature of 120°. Wool fat is easily emulsified and removed under such conditions; the throwster's oil is scoured from the silk fiber by this means. The gum, however, is practically unaffected.

Difficulty of Controlling Alkalinity

The important problem concerned in this process is that of obtaining and maintaining a suitable concentration of hydroxylions in the boil-off bath, such that the gum will be completely dissolved and the silk fiber remain unaffected. Due to the chemical nature of the fibroin it is attacked by alkalies in the same manner as the gum, although somewhat less easily, and with effects very detrimental to the quality of the finished silk. It is impossible practically to control the alkalinity so that its action will be confined strictly to the sericin and not extend to the fibroin. It has, furthermore, been impossible up to the present to determine definitely either the minimum pH necessary to be effective in degumming or the maximum which is permissible without injury to the silk. Similarly it has seemed impracticable to attempt the use of mixtures of soaps and alkalines buffered to a pH value which seemed safe. Even among soaps there is a considerable range of alkalinity and very definitely better results are obtained from the low titer soaps which hydrolyze to a lesser extent.

Two most important factors influencing the rate and extent of degumming are temperature and soap concentration. The first as measured by carefully controlled laboratory experiments acts according to the well-established rule by which the rate of reaction is doubled for each increase of 10° in temperature. At least this is true between the interval from 190° to 200°.

So far as concerns soap concentration, there seems to exist a straight-line function between the proportion of soap to the weight of silk and the time required to reach the maximum boil-off for those particular conditions. In other words, the time of degumming is inversely proportional to the soap concentration, until the latter reaches the figure of 37.5% on the weight of the silk. Above this point increased amounts of soap have no effect either in speeding up the rate of degumming or in increasing the total weight removed.

Soap Problems in Wool Scouring

Wool scouring is a typical example of a heavy duty detergent problem. The amount of dirt that must be dealt with is huge in proportion to the weight of fiber, but fortunately most of this dirt is easily emulsified and removed.

If, for example, wool fat was no more easily emulsified than mineral oil, the wool scourer would have a tremendous problem on his hands. On account of the emulsifying qualities of the wool fat the detergent properties of the soap are not the controlling factor. Instead on this score we must look to the list of characteristics previously discussed as desirable in a soap for treating animal fibers. These give us our only sure and safe guide to the production of a scoured wool retaining or even augmenting the natural characteristic properties.

In the field of finishing we have only to mention the fulling operation to suggest a whole series of extremely interesting problems which have as yet scarcely been scratched. There seems, for example, to be no universal agreement as to the type of soap most suited for fulling nor any sound reasons why the high-titer type frequently preferred is any more efficient than a low-titer soap which will have the advantages of quicker penetration and far more rapid and thorough rinsing.

In the foregoing there have been suggested a number of fields in which the application of soap is of extreme importance to the textile manufacturer. What progress we have been able to make in our own studies has indicated at least the practical value of the continuance of such investigations. But for the completion of a practical scheme of this kind neither the textile manufacturer nor the soap manufacturer is self-sufficient. Both sides have different approaches to the same problem, and both points of view are necessary. In a problem involving interests so closely allied it is only by close co-operation from all concerned that the utmost value of the research will be realized.

That is one of the reasons I am particularly glad to have been invited here to-night to have a chance to speak to you and assure you that, from our standpoint, any way in which we can be of assistance to you in making any search or working out a problem in the use of soap we are only too glad to be of help.

Discussion on Textile Soap Problems

Mr. Hutton—Mr. Bray's discussion will undoubtedly bring questions to your mind. He has covered a very broad field of almost everything we use—silk, wool and other materials.

Member—I would like to have Mr. Bray tell us what is the titer of soap?

Mr. Bray—The solidifying point of fatty acids of which soap is comprised. Soap is a compound of caustic soda and oil. Split the soap with fatty acid—that is, acidify the soap—then the alkaline radical is broken off in fatty acid form. Fatty acid is very closely united to glycerine. A sample of fatty acid is prepared, tried and placed in a beaker and stirred at rather intensive degrees corresponding to the expected titer of this oil. It is stirred in the air, in cold water or ice water, until the fatty acid begins to solidify. There is a certain degree of super-cooling, as it is uniform, to get results. We first notice the decrease in temperature. For example, ordinary oil runs 42 and olive oil runs 20 to 22, and so on.

Dr. Killheffer—A few moments ago I was trying to sell you another idea. Now I would like to sell him an idea. It just so happens that some months ago, when I was expecting to come here to-night, I had rather hazily expected to talk about soap. I am very glad I did not succeed in having that as a subject. I would have felt out of place talking about soap when a soap expert was present. We are not soap manufacturers, but, in connection with our acids, in filling in a little Hexalin we find it will do certain things. We don't know why it will do them. It is pretty difficult to devise experimental methods of proof. You as a soap manufacturer might find it very profitable to play with Hexalin a little more. With it soap rinses out completely. That is one of the things that Hexalin does. I have made a great many experiments and cleaned a great many fabrics, and always when there is some percentage of Hexalin with the soap the dirt is out of the fabric. If you can find out why that is, I would like to know.

Mr. Bray—I would like to know, too.

Dr. Killheffer—It has been recently found valuable in dry-cleaning—the use of Hexalin with soap. Originally they filtered naphtha after the cleaning operation and be-

fore the solution was used again. This filter didn't work with the soap and they tried to put some Hexalin in and it worked better. The use of Hexalin is becoming commercial. The peculiar thing is that it has become a commercial process in part of the dry-cleaning industry and bids fair to be carried farther. Hexalin apparently takes out all greases, oils, dirts and everything else when put through the filter. Everything comes out water-white and goes back and cleans again. I wonder if that isn't based on the great solubility powers of Hexalin for fats and all oils are simply going back in the next batch of materials. We made another of our tests there and found that wasn't the case. Everything was free from oil testing before and after it went through the filter, so we ran tests with and without Hexalin. A great deal of oil was removed when the Hexalin was present, and when the Hexalin wasn't present it didn't remove it. That opens up a very interesting field and, while we are interested in it to a certain degree, we would like to know all we can. Still it does those things in any degree of hardness of water. I cannot tell why that is so, but it is a very interesting field.

Member—I would like to ask Mr. Bray about the modern idea of just exactly what detergence is.

Mr. Bray—As I said before, that is another point; but my own rather hazy idea is something like this: The first factor to play a part is the surface tension of the soap that is absorbed by the alkalies; for example, you would not think of using a mutton soap. Use a soap containing a certain proportion of alkali: two parts soap and one part soda ash. That produces a considerable increase in the whitening-out power. Detergency first comprises wetting out of the fabric; second, loosening the dirt from the fibers of the fabric; third, the emulsification or suspension of that dirt; fourth, flushing the emulsification away while the oil is maintained in the goods. Perhaps the most important part of wetting out a fabric is permitting the detergent to get in intimate contact with all parts of the material to be cleaned. Agitation is an important factor and is very troublesome in promoting detergency, and it might affect the goods in the removal or in aiding the dispersement of the dirt from its lodging-place on the fiber.

Temperature is another great factor. The higher the temperature the easier it is to remove dirt. So far as actual emulsion or suspension is concerned, dirt, solid or liquid, having been wet out and broken up, is surrounded in particles by a film of soap. Soap molecules or fatty acid deters emulsion—mostly all oil and water type or water and oil type. We are interested in oil and water emulsion and dirt and water emulsion, and it is fairly well established that the emulsion of liquid or solid dirt is brought about by the loosening of particles or forming of soap around the particles so that the particles can be flushed away. The final factor is the flushing away. This must be done under such conditions that the emulsification will get the dirt away without redepositing on the fabric. This can be done by using a suds with soap added or after the suds operation. There should be used an emulsifying pail sufficiently long so all the dirt can be flushed out, so that reprecipitation on the fabric will not occur. For example, we start to clean a lot of clothes in a laundry wash, after we have passed them through the soapy water to take the dirt out, then put them in the rinse water. If the rinse water has any hardness, the dirt or oil is put back in the fibers of the fabric and you don't clean.

Member—Is a soap that is lathering a better detergent; and if it is, what would be the effect in degumming silk?

Mr. Bray—The question is to lather or not to lather. So far as we have been able to determine, lather in itself is of no particular value in detergency. It is an indication, however, of a healthy attitude in the detergency pail. Take this case for example: After washing clothes or any dirty fabric, we immerse the clothes in a solution of soap. The soap is an important point. At the beginning we will doubtless have a lather. As we continue to work the clothes or dirty fabric, the dirt is gradually removed from the cloth and the soap is used up in forming a film around the dirt, as explained a few minutes ago, and the effective soap concentration is reduced. The soap is put to work and uses up the lather. If there is lather remaining, it is to my mind an indication of excess soap present, which is largely destroyed. Apparently you can never entirely destroy lather by the addition of dirt. You can always, even in a dirty solution, by taking a portion of the liquid and shaking it vigorously in a bottle, raise a suds on it that is permanent. Generally we can say conditions are healthy in a detergent pail when there is sufficient soap present to emulsify dirt. There are certain conditions under which soap is used where a lather may or may not appear and may or may not indicate anything regarding the detergent properties of the pail. Such things often arise in fulling. Some fulling agents do not give a lather and yet full and to a large extent scour at the same time with perfect satisfaction. Now, what was the second part of that question?

Member—You don't have to answer the second part. If you had answered the question the other way I would want the second part answered.

Mr. Bray—So far as temperature is concerned, under equal consideration a high-titer soap lathers better at a high temperature and a low-titer soap lathers better at a low temperature. You can use either soap and get good results. It is probably easier to use the higher titer soap in the degumming pail, but they both have equal consid-

eration. The high-titer soap will lather more. Not that it means anything in degumming silk; you still have the detergent power.

Elected to Membership

The following were elected to membership in the Association at the fifty-first Council Meeting held at the Chemists Club, New York, March 30, 1928:

Active Members

Acker, Frank J., demonstrator-salesman, National Aniline & Chemical Company, Chicago, Ill. Address: Parkway Hotel, Chicago, Ill.

Bolen, W. P., dyer, Hickory Spinning Company, Hickory, N. C. Address: Hotel Hickory, Hickory, N. C.

Collins, Lucius, demonstrator, E. I. du Pont de Nemours Company. Address: Room 9117, Du Pont Building, Wilmington, Del.

Cosby, John C., salesman, Ciba Company. Address: P. O. Box 969, Greensboro, N. C.

Farlow, W. A., color matcher and dyer, Deep River Mills, Randleman, N. C. Address: P. O. Box 62, Randleman, N. C.

Fieldhouse, C. B., demonstrator, Ciba Company. Address: 233 West Huron Street, Chicago, Ill.

Forstall, W. C., chemist in charge of laboratory, S. Sanford & Sons, Inc. Address: Care of S. Sanford & Sons, Amsterdam, N. Y.

Freedman, Ephraim, chemist. Address: Bureau of Standards, R. H. Macy & Co., Thirty-fourth Street and Broadway, New York City, N. Y.

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Hartmann, Adolf C., in charge printing department, Sidney Blumenthal & Co. Address Maltby Street, Shelton, Conn.

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Koff, John W., district manager, Newport Chemical Works, Inc. Address: 36 North Jefferson Street, Chicago, Ill.

MacNaught, John T., dyer, Cocheco Woolen Manufacturing Company. Address: East Rochester, N. H.

Mease, Arch J., salesman and demonstrator, Newport Chemical Works, Inc., Chicago, Ill. Address: 112 Ontario Street, Oak Park, Ill.

Myers, H. N., Aniline Black dyer, Proximity Print Works, Greensboro, N. C. Address: Proximity Print Works.

Murray, Clyde, dyer and bleacher, Mayfair Mills, Inc., Greensboro, N. C. Address: Route No. 8, Burlington, N. C.

Parker, Samuel I., assistant superintendent, Proximity Print Works. Address: Greensboro, N. C.

Pickens, W. I., demonstrator, E. I. du Pont de Nemours Company. Address: Box 485, Chattanooga, Tenn.

Radford, G. S., consulting engineer, 2 Rector Street, New York City, N. Y. Address: New Canaan, Conn.

Robb, Wm. Cox, salesman, General Dyestuff Corporation. Address: Box 1314, 111 Arch Street, Philadelphia, Pa.

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Stevenot, Geo. A., chemist and proprietor, Geo. A. Stevenot & Co. Address: 280 Baltic Street, Brooklyn, N. Y.

Taylor, Harold H., chief chemist, Sidney Blumenthal & Co., Inc. Address: 108 Prospect Avenue, Shelton, Conn.

Toupense, Marcel J., boss dyer, Lyons Piece Dye Works. Address: 478 Madison Avenue, Paterson, N. J.

Turner, Thos. J., chemist, C. H. Masland & Sons, Philadelphia, Pa. Address: 2337 W. Harold Street, Philadelphia, Pa.

Wallace, Jr., David G., salesman and demonstrator, Geigy Company, Inc. Address: 1515 Forest Avenue, Columbus, Ga.

Walter, Howard A., teacher, Philadelphia Textile School. Address: 5709 Willows Avenue, Philadelphia, Pa.

Wille, C. W., dyer, Burson Knitting Company. Address: 1602 Chestnut Street, Rockford, Ill.

Junior Members

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Ward, George C., student, Lowell Textile Institute, Lowell, Mass. Address: 78 Lowell Street, Andover, Mass.

Warren, Maybelle, student, Lowell Textile Institute, Lowell, Mass. Address: R. F. D. 1, Billerica, Mass.

Associate Members

Ernst, E. F., president Products Trading Company, 2 Hudson Street, New York City, N. Y.

Griffin, Frank A., salesman-demonstrator, American Cyanamid Company, 535 Fifth Avenue, New York City, N. Y.

King, Gelston T., vice-president and treasurer, E. & F. King & Co., Inc., 405 Atlantic Avenue, Boston, Mass.

McCarty, A. B., manager, American Aniline & Extract Company, 141 North Front Street, Philadelphia, Pa.

Smolens, H. G., Buffalo Electro Chemical Company, Buffalo, N. Y. Address: Care of Alex Fergusson, Jr., Textile Building, Philadelphia, Pa.

Applicants for Membership

Active Membership

Alet, Henri J., superintendent silk dyeing and finishing plant, Vaucanson Dye Works, Port Jervis, N. Y. Sponsors: Charles C. Knights and Henry D. Arnold.

Reall, Edward A., chemist and dyer, Geneva Mills, Wanskuck Company, Providence, R. I. Sponsors: J. W. Clark and F. C. Cushing.

Scharschmidt, Paul H., boss dyer and finisher, Hamilton Woolen Company, Southbridge, Mass. Sponsors: R. L. Burnett and I. L. Sheldon, Jr.

Tisdale, Harry R., traveling salesman, American Dyewood Company, New York City, N. Y. Sponsors: S. L. Hayes and Dr. Emil Lesser.

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Price, Fred, dyer, Sweetwater Hosiery Mills, Sweetwater, Tenn. Sponsors: W. B. Carter and J. B. Smith.

Sloan, Robert D,. dyer, National Yarn Process Company, Rossville, Ga. Sponsors: B. R. Dabbs and L. L. Bamberger.

Smith, Robert H., assistant dyer, Magnet Knitting Mills, Clinton, Tenn. Sponsors: H. A. Rodgers and W. H. Bohanan.

The Questionnaire Is Important

ALL members of the A. A. T. C. C. have received, or will shortly receive, a copy of the regular annual Questionnaire. This is to be filled out and returned at the earliest possible date. It is to be filled out as completely as possible. Most of the information requested is absolutely necessary for use in compiling the 1928 Year Book and arranging the next Annual Meeting. The accuracy and value of certain parts of the Year Book and, in some measure, the success of the Annual Meeting depend largely on the care with which this Questionnaire is filled out. EVERY member will kindly co-operate with the Association by returning his Questionnaire as early as possible.

— Fill It Out Fully —

Division of Dye Chemistry of the American Chemical Society

Abstracts of Papers Presented at the Meeting in St. Louis, Mo., April 16 to 20

Use of Buffers in the Determination of Color by Means of Titanium Trichloride: I—Amaranth, Ponceau 3R and Orange I. O. L. Evenson and D. T. McCutcheon.—For the evaluation of the color content of any dye by means of $TiCl_3$ the correct buffer must be determined. If the sodium or potassium tartrates are used as reported in the literature, correct results are not obtained for every dye. This paper applies to possible buffers and in particular to methods for Amaranth, Ponceau 3R, and Orange I. The color content of Amaranth may be determined accurately in the presence of sodium citrate, sodium bicarbonate, and potassium antimony tartrate. That of Ponceau 3R may be determined in the presence of sodium citrate and sodium bicarbonate. Orange I may be titrated correctly in the presence of sodium citrate, sodium carbonate, and the tartrates, excepting potassium antimony tartrate.

The Physical Constants of o-Dichlorbenzene. T. S. Carswell.—o-Chlor-aniline, prepared by the reduction of nearly pure o-chloronitrobenzene, was purified by recrystallizing the hydrochloride. The purified product was converted into o-dichlorobenzene by diazotization and treatment with cuprous chloride. The resulting o-dichlorobenzene, after fractionation, showed the following physical constants: Crystallizing point, —16.8°; boiling point (757.4 mm.), 180.2°; boiling point change for 1 mm. change in pressure, 0.059°; density at 15°/15°, 1.3112; density at 20°/20°, 1.3088; refractive index, to be reported.

The Preparation of Quinizarin. Max Phillips. (Preliminary report).—Phenol was chlorinated either with sulphuryl chloride or with chlorine and to the reaction product (which was not purified), phthalic anhydride, conc. sulphuric acid and boric acid were added and the reaction mixture heated for four hours at 200° C. The quinizarin was isolated and purified in the usual manner. Yield 50 to 60 per cent of theory.

The Manufacture of Anthracene: A Survey. Harry F. Lewis.—Owing to the possibility of the return of the manufacturers of anthraquinone to the use of anthracene as a raw material, it has seemed worth while to review such methods for the separation and purification of anthracene as have given favorable use in the past. A survey of the patent field has been compiled and considered in connection with material in the chemical constants of anthracene, phenanthrene and carbazol has been made and their application taken up in connection with the purification of crude anthracene. The relation of anthracene and anthraquinone will also be considered.

A. S. M. E. PLANS FUEL RESEARCH

In October of last year the American Society of Mechanical Engineers appointed a Special Research Committee on Fuels, which was authorized to correlate all available data on fuel research. The working plans of this committee were laid down at its organization meeting in December.

It is believed that the committee, as constituted, is a strong, well-balanced one; its members, all of them well known, were especially chosen for their familiarity with both technical and practical fuel problems.

The general plan, as presented to and approved by the Main Research Committee, is as follows:

Scope and Purpose of Research:

(a) The gathering and correlation of results obtained and of studies being pursued, in fuel research; with the idea of making known and available, as far as possible, the progress made and the different phases under investigation.

(b) The direction, to such extent as may be possible and advisable, of the lines of fuel research being and to be pursued, with the adoption of plans for carrying them on.

(c) The development and conduct of definite research projects in fuels which will involve the selection of personnel and facilities for research and the securing of necessary funds for the carrying on of such projects.

Research in fuels is so broad, complicated and important, both to industry and the profession, that the scope and purpose of the recommended project, as outlined above would be of immense value, if carried out.

The committee suggested that, acting as a neutral medium between all groups, producers, distributors and consumers, it could be the means of:

(a) Securing all existing fuels research data,

(b) Making it available to those interested,

(c) Focusing attention upon fuels research projects that are being studied or that need investigation.

(d) Securing the necessary aid for carrying on various research projects, as deemed advisable.

The committee suggested should be divided into several groups; each group to handle one of the specific general directions to its particular research program.

As preliminary to organizing actual research work, the committee, at its first meeting, recognizing the necessity for and value of, obtaining exact and definite knowledge regarding research work now being carried on or planned, decided to assign to each member the work of securing the desired information regarding his particular field, as included in the broad, general subjects for research determined upon.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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MORE AND FASTER DYES BUT FEWER DOLLARS

CROWD psychology has been the subject of some enlightening scientific inquiry, and not the least interesting phase of this study has been concerned with the logic of the mob, or, as it might be termed, "public logic" to distinguish it from the sounder logic of scientists or philosophers. In the public's attitude toward big business we may see how its logic manifests itself in many old but still prevalent fallacies. "If Henry Ford sold more cars last year than the year before, he made more money last year"—this type of reasoning is commonly overheard. Based on an apparently sound business principle, such reasoning is, as any one with a smattering of economics knows, fallacious simply because in generalizing and in taking too much for granted it overlooks the decisive factors. A reduction in the price of Ford cars would obviously enter into any calculation of profits on sales. The fact that the reduction was forced by competition would also affect the calculation. But too often these are just the factors that are ignored. It is inconceivable to the public that an industrial wizard like Ford *might* have lost money or made less, even though he sold more cars, and being inconceivable the idea is merely waved aside.

Similarly it is often declared by unthinking persons that American dye manufacturers are making more money each year because more domestic dyes are now being sold, quantitatively speaking. The quickest way to refute such generalizations is to quote a few simple statistics on dye sales such as those lately given out by the Tariff Commission.

The quantity of coal tar dyes sold by American manufacturers last year, for example, was forty million pounds higher than the poundage sold in 1921—but the *value* of last year's dye sales dropped one million dollars below the value for 1921. The industry sold considerably more dyes than in 1921 but made less money. The value is determined, of course, by the weighted average price (this latter being the total value of all dyes divided by the total quantity) and the average price for 1927 was only 39 cents while in 1921 this price was 83 cents. Last year's average price was the lowest on record.

To put the same idea in another way, since there has been a drop of more than 100 per cent in the average price of American dyes in the last six years, a decrease in the value of sales is a perfectly logical result. The increase of forty million pounds over the *quantity* sold six years ago has not been sufficient to counteract the effect of the lower price per pound.

The reduction in the profits of our dyestuff manufacturers would be more disheartening if it were not almost offset by another condition revealed in the Tariff Commission's preliminary report on the dye industry's progress during 1927. A healthy increase in our production of vat dyes last year is recorded as a significant feature of the annual dye census. The poundage of vat colors produced in 1926 was 54 per cent greater than that of the preceding year, and that this remarkable progress continued during 1927 is disclosed by the news of a further increase of 500,000 pounds in the output of this class of dyes.

Few things can spur American dye producers to greater effort and higher achievement than a more popular and appreciative reception of their high grade fast colors such as their vat dyes. Despite all that has been written and said on the subject, this remarkable product of our chemical manufacturing skill has not yet been acclaimed with sufficient enthusiasm by the country's' textile industry. As the Tariff Commission declares in its Census:

> The ultimate consumer is rapidly coming to a realization of the economy of fast-dyed fabrics... Credit is due domestic manufacturers of vat dyes, who have overcome tremendous difficulties in developing one of the most complex of the whole group of synthetic organic dyes. The buyer of a vat dye is assured of definite properties of fastness in the fabric on which he uses it and the ultimate consumer is assured of the longer life of the garment made of a fast-dyed fabric. The increased consumption of the vat dyes is proof of the demand for them.

To those few who remain stubbornly skeptical when American fast dyes are alluded to, therefore, we politely suggest a moment's thought on what is implied by these simple statistics:

Output of American vat dyes in 1921....1,100,000
Output of American vat dyes in 1927....4,500,000

And to mills, if there be any, that persistently refuse to pin their faith to the domestic fast colors, it should be mentioned that many more of their wiser competitors are using American vats today than ever before. That fact alone should help to compensate our manufacturers not

only for the research that made good American vat colors possible but also for the million-dollar drop last year in their profits.

UNITE THE GROUPS FOR A GREATER INDUSTRY

ONE aspect of the spirit that distinguishes our era of industrialism from preceding areas is our ready acceptance of the doctrine of co-operation. In the United States the swing to co-operation has been strongest in commerce and industry, simply because this country has developed those phases of its life to a more marked extent than all other phases.

Any individual who joins a fraternal or trade organization thereby tacitly becomes an exponent of the doctrine of co-operation. But there is a co-operation that is narrow and a co-operation that is broad, and many of us fail to distinguish them in our minds as being of different degrees of value. The narrow co-operation draws together individuals of similar interests or occupations, but draws them apart, *as a group*, from other groups in their community or industry; they congregate for the purpose of assisting each other individually or of assisting some minor cause, and so absorbed are they in this worthy purpose that they do not realize how easily they have grown selfish and exclusive as a group.

The broader kind of co-operation is that which brings into contact the separate groups of occupations or trades or professions. It is a movement by which the groups merge their interests for mutual advancement and benefit. Those who have been expounding the doctrine of group co-operation are of the higher type of mind that looks beyond the petty problems of the individual or isolated clique to the greater problems of entire communities or industries. They would multiply the fruits of co-operation by means of broadly organized, intelligently directed group action.

Business men have in general fostered larger and more successful movements in group co-operation than technical men. The trades of an entire industry, arranged vertically—with those who handle the raw material at the bottom and those who retail or consume the finished article at the top—have been organized to co-operate mutually on their economic problems. The technical groups of that industry, on the other hand, have practised the narrower kind of fraternal co-operation by herding themselves into a number of more or less exclusive bodies. This has not been invariably the case, but the exceptions have been few. The technical problems of an industry are, in too many cases, allotted to several different groups rather than pooled for mutual examination and solution by *all* the groups of the industry.

A pertinent instance of broad co-operation among business interests is seen in the recent establishment of a Textile Forum in New York City by the Textile Section of the New York Board of Trade and Transportation. The chairman of the Section, Dr. M. Leo Gitelson, alluding to the fact that there are in the city seventy-five distinct textile associations that represent specific divisions of the industry, is quoted as saying:

> The large number of associations extant proves vividly that the doctrine of co-operation has been fully accepted in so far as "parochial" interests of each group are concerned. The marked absence of interassociation contacts throughout the industry considered as an integrated unit, however, indicates that the lesson of co-ordination is still one that must be learned.

The textile trade of New York City, in other words, has been for years preaching and practising co-operation of its members, but it has until this time been practising the narrower kind of co-operation. The newly established Forum proposes to unite the activities of the numerous trade groups for the benefit of the city's entire industry. To quote Dr. Gitelson again, "Knowing each other and our intimate problems better must result in ultimate good." In many other industries the narrower individual contact through exclusive little coteries is being superseded by interassociation contacts which not only benefit an ever-widening circle of individuals but also advance more rapidly the welfare of whole industries.

The case of New York's textile trade forum is typical of numerous movements for large-scale economic co-operation now being planned in many American industries. But while the lead in such movements has been taken everywhere by business groups, the technical groups of many industries have not been quick to follow. In the textile industry, it is true, there are not as many distinct groups of technical men as there are trade groups. But each process of textile manufacture and maintenance has its own particular class of technologists, and these have formed into a number of small, separate organizations. Some trade groups in the textile industry have special committees of technical men, such as chemists or research workers, and a few have research divisions. These committees and divisions would therefore represent each particular trade's group of technical men.

What is obviously needed is a consolidating agency like the Forum established by the business men of New York's textile trade, through which these various technical groups could co-operate more closely. Some of the groups are co-operating right now. The dry-cleaners and the laundryowners, for example, having many common problems, are learning to arrive at some mutual understanding of those problems through interassociation contact. The Converters' Association, through its Committee on Misbranding, has been assisted in standardizing the fastness of fabrics by the Research Committee of the American Association of Textile Chemists and Colorists. But among manu-

facturers, wholesalers and retailers there are many other groups of technical men that should participate in such co-operative activity, and throughout the entire textile industry among all groups of individuals engaged in the wet processing there should be more intimate understanding of the various technical problems of each group and of the whole industry.

Perhaps the establishment of a Technical Bureau such as that recently proposed by the president of the American Association of Textile Chemists and Colorists may eventually lead to the creation of a central agency through which the many distinct groups of technical men in the textile industry may unite their activities for the advancement of all.

EXTRACTORIALS

These days the dyestuff manufacturers are aiding their customers materially, and are instructing the dyers as to the colors most suitable for the fiber. In the early days the dyer had to work out his own salvation, and it was a case of constant experimentation. To-day there are certain standardized processes, and in addition we know that the fiber which we handle has certain uniform qualities and properties, and also know just how it may be expected to shape up during and after the dyeing operation. *Bernard Rentrop, Reviewing Progress in Rayon Dyeing.*

It is not necessary to emphasize the need for organization in industry to promote educational facilities for textile workers. Another important and necessary work lies in promoting propaganda concerning the industry with a view of cultivating a favorable public opinion.—*Editorial, Canadian Textile Journal.*

It is necessary for a man who works help to know them. It matters not what position he occupies. . . . It has always been my policy to know my help as best I could, and I have not failed yet to get work out of an employee. You might try to have set rules, but set rules for everybody will not work. I have had people that I did not dare speak to and others that in a sense I had to cuss out. If you want to make a success in your work you must get next to them. You must know them for a long time.—*S. T. Buchanan, Superintendent of the Piedmont Manufacturing Company.*

Fortunately for us, modern chemical research is continuously developing materials and processes. The extremely rare and high-priced chemical compound of yesterday is frequently the essential constituent of a successful process of to-day. Since the war many new and extremely useful organic compounds, many of them in the nature of very powerful solvents, have appeared in commercial quantities in the world markets. Their proper application has solved many problems in widely different industries.—*Prof. Charles E. Mullin, in Canadian Textile Journal.*

More important than the condition of any individual industry is the solid foundation of commercial and financial strength upon which business rests. No one who has looked over the annual reports of our leading corporations for the past year can fail to be impressed with the well-nigh impregnable position which most of these reports reveal. Never before has business been so solidly entrenched in cash and so unencumbered with inventory. A few overextended spots can be found, as always, but nothing which in the event of bankruptcy would cause more than a local disturbance.—*National City Bank Report for April 1.*

Here lies the difference between the ancient and the modern seers or prophets. The modern prophet is a doer. No one can fix the best ratio between thinking and doing. The pure thinker is apt to think too much and the active man to be too active. Evidently that Mendelian law which determines mutations and produces increased strength by cross-breeding explains why a certain mixture of thinking and acting yields the greatest product.—*Dr. W. R. Whitney, Speaking on Dr. Irving Langmuir, Perkin Medalist.*

In the present huge annual expenditures for industrial research we have convincing proof of the growing appreciation of its essential nature in providing the path for improvement in all arts and sciences. In the infancy of an industry, and the engineering that guides it, problems are simple, and individual initiative and ingenuity are the chief requisites of success. But as an art grows and expands its requirements become complex to the point where research is essential to further development.—*Chas. H. Schwab.*

The best solution to the textile problem is skilled men in the mill with good machinery and cut out all of this efficiency bunkum and give the load to the practical men and let them make good or get out. Under such conditions there would be mighty few changes, and wages would advance rather than be cut, and there would be peace and prosperity.—*Fiber and Fabric.*

The future belongs to the experimentalists, technicians and captains of industry who have the courage to apply the results of fundamental research in all branches of science, and the industry is fortunate in possessing men capable of tenaciously pursuing new knowledge and of applying the results without flinching to the very large units employed in every day manufacture.—*Arthur Blake in the Manchester Guardian Commercial.*

The Dyer's School of Experience

[EDITOR'S NOTE.—*The following contribution by Mr. White is most interesting and is undoubtedly typical of a fault only too common in our technical publications. Many writers on technical subjects are only too prone to express opinions upon matters of which they have no practical experience, and these opinions are consequently, in many cases, not only erroneous but actually harmful. In this particular instance Mr. White cites a writer who attached a degree of unknown significance to his name, and apparently feels that this added to the likelihood of the article doing real harm. We wish to take exception to his opinion in this matter. There are fully as many writers without degrees as there are with degrees who make errors of this kind. In the last analysis it is a question of the individual and not of his training. There are many irresponsible persons who simply have a mania for writing and who apparently must write even though they have nothing worth while to say. It is the duty of the editor of a technical publication to examine such articles carefully and see that they do not get into print in his own paper. In the last analysis I feel that it is probably 75% the man himself and 25% his education which put together make the 100% possibilities of the man's accomplishments.*]

THE DANGERS OF MISLEADING ADVICE

By NOEL D. WHITE,
Davenport Hosiery Mills, Chattanooga, Tenn.

IN changing over from dyeing silk skeins to dyeing hosiery I knew at the start I had a lot to learn. Up to this time the only knowledge I had of dyeing machines, except for some jigs and belt propelled reels used in the piece dye house—which I had hurried through while getting an inkling as to how to dye mixed textiles—was from some illustrations in machinery advertising.

On taking up my new job, however, I soon found that in this respect I was no worse off than many already in that line of dyeing. I could see from the work of others in those days that silk and cotton hosiery dyeing was not a very exacting art.

I had been going around the hosiery counters in the department stores to see how close were the matches they had. Some were terrible; the cotton a different color than the silk and streaks and uneven dye—all these were to an experienced eye very prominent. But what attracted my attention most was that the finish on all silk hosiery was not the finish that I knew could be put on silk if properly processed.

I had found the reason why my employer had so urgently advised me to move my family and settle here. I had come on trial and was anxious to make a good showing in handling this new work of dip dyeing hosiery and naturally, having dyed silk all my life, I knew how silk had to look and feel and meant to show my employer he had made no mistake in getting me here. I took extra care in boiling off and that was, and is today, the outstanding reason our goods showed up so well from the start. Within the week I was told I had made good. Dyeing with the rotary dyeing machines was not, after all, such a difficult thing to learn. So I told them we would try to do our work as well as possible with the conveniences at hand and to learn all we could.

All literature I could get on the subject was carefully read. If I needed any help from any of the articles written in those days on that subject I was going to be disappointed. From the bulk it seems that most writers were giving theories. Very few had anything of real value and some of the writers would have done actual damage to anyone attempting to follow their advice.

In writing this I do not wish to be misunderstood, but I am going to offer some criticism in the hope that future writers of technical matter, especially concerning work in a dyehouse, should be more circumspect and give advice and formulas only when very sure that what they say is correct. Old and experienced dyers seldom read or follow new and untried ways. They have their own experiences to draw from and even if they get into trouble occasionally they usually find their way out. If they read anything in the line of dyeing and find that what they read is not exactly the way they go about it in their work they pay no attention. Anyway, "it is hard to teach an old dog new tricks." The young ones on the other hand, if at all ambitious, are eager to learn and may follow the advice of these writers only to find, to their sorrow, that they have been led astray.

Some time ago I read in a periodical an article reprinted from a leading textile magazine and written by a man with a B. E. suffixed to his name, a well written article describing the difficulties encountered in dyeing silk and mercerized hosiery. If he had confined himself to that there would have been no reason for this criticism, but he went further and wanted to advise on the best way to boil off and dye silk hosiery, giving what he claimed to be the best formulas for three different methods. I must put them down here as they appeared in that periodical for the benefit of my readers.

First method: 4 to 6 per cent of a good white chip soap; 2 per cent silicate of soda. First dissolve the soap thoroughly in boiling water, being sure there are no lumps or gummy particles left. When well dissolved pour into machine and then add silicate which has been diluted in three or four gallons of hot water. Bring the bath to a boil and boil very gently for one hour.

Second method: 4 per cent of good white chip soap. 2 per cent silicate of soda; 2 per cent sulphonated castor oil. Proceed by dissolving the soap and diluting the silicate and oil.

Third method: 4 to 6 per cent of good sulphonated castor oil; 2 to 4 per cent silicate of soda. In this case

it is only necessary to dilute the ingredients before adding to the bath as both are already in liquid form.

Where that B. E. found the justification for such statements I can not say, but it is certain that he has never actually done it. Not even in a laboratory. It simply cannot be done. Allowing that in 100 lbs. of silk and cotton hosiery the silk content is 40 to 50% it has been my lifelong experience that it takes from 25 to 30 per cent of soap or its equivalent of sulphonated oil or anything the dyer wants to use in order to get the silk properly degummed. Any silk dyer will bear me out on that. Now in degumming silk hosiery, which, experience has taught, is best done in net bags to protect the silk from tangling and chafing, if the minimum amount of soap is used there is danger of the goods on the inside of the bags being reached by the degumming agent in too weak and exhausted a condition to work properly; hence it is obvious that the larger percentage of soap or oil is necessary or an uneven boil-off and consequent hard work will be the result.

One day not very long ago we had a man come to our plant to demonstrate the advisability of using what he had to sell. It was a good product and we had already decided to give it a trial. As the young man, however, insisted that he would like to show how he could save for us soap, chemicals and time in boiling off with his product, I let him do it his way. Starting the bath he used for 200 lbs. of goods 16 lbs. of olive oil soap and 2 lbs. of his chemicals. The machine loaded, he started at 120° F., raised it to a boil and boiled for one hour. At this time we took a sample, washed it and dried it. The gum from the silk was far from being removed. There was not enough soap nor chemicals in that bath. I took hold at this time and with more soap and a little soda ash completed the operation. I could have told that man that he had not enough material for a good degumming, but I wanted him to see for himself and I cite this case as a good example to show how that B. E (whatever that stands for) was shooting far from the mark with his advice on boiling off silk.

That, however, was not the only misinformation he gave in his article. He advised also that if possible it was desirable to have a small amount of water constantly entering the boiling soap to insure the bath flooding over ! ! ! I have read a number of absurdities but this assuredly takes the prize.

That has been the trouble right along among cotton and woolen dyers attempting to dye silk. They cannot get the silk soft enough and in numerous instances I had dyers ask me why they could not get it soft. They find it hard to believe that it is only lack of soap in boiling off. Give it plenty of soap and keep your bath as strong as possible until the end of the operation if you want good results.

If I had known personally the gentleman who wrote the article referred to I would have gone to him and told him how wrong it was to publish any such misinformation. I have no quarrel with him and hope he does not feel hurt if he happens to read this and recognizes it for his work but I must explain that he not only was making it hard for a beginner but he was also putting dyers in precarious circumstances. Supposing a superintendent had read that article and started to figure on the amount of soap used by his dyer and to compare it with the figures suggested by that writer! He could have gone to his dyer and told him he was wasting at least twice the amount of soap he used in his boil off and I know by experience it would have been a hard proposition for that dyer to convince his superintendent, or manager, that what he had read was the work of a B-um E-xpert.

ON CHEMISTRY'S ULTIMATE MISSION

"Our physicians apply with skill the discoveries which science makes available to them; but, after all, they can only administer. Further advances must be made by the trained researchers in science," said Dr. Charles H. Herty, of the Chemical Foundation, in an address several months ago before a joint meeting of the Virginia Section of the American Chemical Society and the Woman's Club of Richmond. The address has been published in booklet form and is being distributed by the Chemical Foundation. Besides Dr. Herty's speech on "The Ultimate Mission of Chemistry—Good Health," which is a plea for united action in financing research for better health, the booklet contains the text of the Ransdell bill, which provides for the creation of a National Institute of Health within the U. S. Public Health Service. This bill was first introduced in Congress last year and Senator Ransdell plans to reintroduce it in the present session.

INITIAL TREATMENT OF EYE BURNS

(*Continued from page* 282)

and I douched the eyes and head freely with a 2 per cent solution. The eyes were completely restored, but the lye destroyed every trace of hair on the scalp, eyebrows and eyelashes.

I should like to conclude this article by citing experiments which are like our author's, but which led to directly opposite results. The burns which were caused by instillations of alcoholic extracts of various glands could not be cured by water. After irrigation the injury to the iris and ciliary body remained (See Infiamazzione dell'iride in seguito ad iniezioni di estratti ghiandolari, Archivio di ottalmologia, 1926).

We learn by hard experience the value of the only safe rule—to do *nothing in emergencies which we are not absolutely sure is right*, and in burns of the eye simply to cover them with a clean bandage and wait for a physician and proper remedies. It is wonderful how the eyes escape what seems at first like absolute loss by the rapidity with which the lids close. *It is most harmful, therefore, to get in a panic and use the first available solution.*

Dyeing and Cross-Dyeing Celanese in the Presence of Other Fibers*

The Dyeing Properties of Celanese—Printing Celanese with Vat Colors—Methods of Desizing and Wetting-Out—Stating Troubles in Knitting Hosiery—Pretreatment

By TODD B. MEISENHEIMER

Southern Representative, Celanese Corporation of America, Charlotte, N. C.

THE subject of dyeing and finishing all-Celanese fabrics and the cross-dyeing of Celanese in the presence of other fibers covers a great many processes and conditions; therefore, in order to mention most of these cases and to stay within the time allotted this subject, I shall have to deal with these processes briefly. Most of you are familiar with this subject from the great number of articles you have read in trade papers, etc. For this reason I shall not ask you to listen to detailed formulas but shall only treat the subject generally. However, if anyone is interested in detailed formulas covering any of the cases I mention, I shall be glad to furnish formulas for him.

Celanese differs from other synthetic fibers or so-called rayons chemically in that Celanese is an ester of cellulose and acetic acid, whereas the rayons are regenerated cellulose. This chemical difference causes Celanese to have an entirely different affinity for dyestuffs from any other textile fiber. For this reason various dyestuff firms have developed an entirely new group of colors for dyeing Celanese.

This new group of colors, known as dispersion colors, are made from some of the same bases as vat colors. Therefore, when dyed on Celanese these colors are as fast to light, washing, and uric acid as the well-known vat colors are on cotton.

In the process of manufacturing dispersion colors the anthraquinone or vat bases are passed through a colloidal mill and are dispersed with sulpho-ricinoleic acid, from which method the SRA colors, one of the well-known dispersion groups, receive their name.

The dispersion colors dye Celanese direct; in fact they dye very similar to direct colors on cotton. However, the dispersion colors require no catalytic agents, such as salts or acids for exhaustion.

Woven goods made entirely of Celanese are generally dyed on a jig dyeing machine. However, in some finishing plants the voiles are being dyed in open vats by fastening one selvage with strings to poles which rest across the top of the vat, the other selvage hanging at the bottom of the vat. Thus the fabric is laced in the vat and is agitated as desired by moving the poles backward and forward on the sides of the vat, very similar to the manner in which poles used for skein dyeing are moved by sliding backward and forward.

Printing with Vat Colors

Fabrics made entirely of Celanese are also printed in designs by the general method of engraved rolls, using printing pastes made from vat colors. Printing pastes are also made from dispersion colors, but due to the oily nature of these last-mentioned colors it is impossible to get clean edges on the figures in some designs.

Considerable progress has also been made during the past year in the discharge printing of Celanese fabrics. This has been achieved by the development of a series of colors suitable for dyeing Celanese which are dischargeable with different reagents.

Since Celanese has a different affinity for dyestuffs from the other textile fibers, it is possible to dye real silk, wool, linen, rayon, or cotton with the various groups of dyestuffs in the presence of Celanese, leaving the Celanese white or cross-dyeing it any contrasting color desired. However, to leave the Celanese white, it is necessary to select from the various groups of dyestuffs the proper colors to be used on the other fibers. That is, if direct colors are used for dyeing rayon or cotton, then select the pure direct colors that are not shaded with basic colors, as some of the basic colors stain Celanese heavily. Although the basic colors are not considered fast enough for Celanese piece goods, these colors are sometimes used for cross-dyeing fancy hosiery where the fastness of the color is considered satisfactory to washing. For cross-dyeing real silk or wool it is also necessary to select acid colors which leave Celanese unstained.

Rayon or cotton can also be dyed with selected sulphur colors in the presence of Celanese. However, in order to do this it is necessary to use as little sodium sulphide and soda ash as possible, keeping the temperature of the dye bath around 100° F., or use animal glue in the dye bath if temperatures are run as high as 185° F.

At this point I should mention the methods used for wetting-out and desizing all-Celanese and Celanese-mixed fabrics before dyeing. The sizing used for Celanese yarn is easily removed by running the goods at 180 to 185° F. in a bath made up with neutral

*Paper delivered at the recent meeting of the Dyers', Bleachers', Mercerizers' and Finishers' Division of the Southern Textile Association held in Charlotte, N. C.

soap and sulphonated castor oil, and this method is used for goods having Celanese warps. Celanese-mixed fabrics having rayon or cotton warps should be desized with an animal or vegetable diastase. However, if these warps are lightly sized, the soap-and-sulphonated-castor-oil wetting-out bath, as suggested for fabrics having Celanese warps, will be sufficient.

Celanese, like real silk, will not stand strong alkalies at high temperatures. However, it is possible to mercerize cotton piece goods that have been decorated with Celanese without injuring the latter. This can be done by not allowing the mercerization bath to go higher than 59° F.

Methods for dyeing vat colors on rayon or cotton in the presence of Celanese were first developed by eliminating caustic soda and using sodium salts for reduction agents, such as sodium phenolate, sodium beta-naphtholate, etc. However, methods have now been developed whereby reduced quantities of caustic soda are used to obtain satisfactory reduction of vat colors.

Celanese has also been used extensively in the knitting of men's fancy hosiery to obtain two and three color effects by cross-dyeing with other fibers.

This particular line of manufacturing has developed some interesting problems from the dyer's standpoint, which problems I shall mention briefly, along with the methods developed for overcoming them.

As you all know, the colors recommended for Celanese are supposed to be dissolved in a boiling soap solution, and the dyeing carried out in a soap bath. A great many of the hosiery mills in the South are located in sections that have hard water. As some of these mills are small, they do not have expensively equipped dyehouses having water softeners, etc. Therefore, the method of dissolving Celanese colors and dyeing in a soap bath was impossible for those mills, as the soap caused the dyestuffs to be precipitated on the goods in spots, resulting in a condition that made it almost impossible to salvage the goods. This trouble was overcome by substituting a soap made from sulphonated castor oil and soda ash, which does not precipitate under hard water conditions.

The fancy hosiery business has constantly been developing toward more elaborate designs. This has resulted in the rapid development of fancy and complicated knitting machines that require yarns to be more flexible and under perfect control at all times.

Static Trouble in Knitting Hosiery

Due to the fact that Celanese and rayon yarns have a tendency to take up static electricity generated by belting, etc., this condition, unless it is eliminated, causes considerable trouble in knitting certain fancy designs. It has been found that by treating the Celanese and rayon yarns with conditioning oils this treatment shunts or grounds static electricity and also makes the yarns much more pliable when knitting.

This oil conditioning of yarns and the use of fancy knitting machines which require the use of excessive quantities of lubricating oil, resulting in mineral oil spots on the goods, developed another serious problem in the cross-dyeing of Celanese-decorated hosiery. It happens that any kind of oil on wool, rayon, or cotton acts as a mordant for Celanese colors. Therefore, unless wool grease, conditioning oils, and lubricating oils are removed from the goods before the Celanese colors are added to the dye bath, then very undesirable results are obtained. I am glad to be able to say that this trouble has been entirely overcome and perfect cross-dyed effects are being obtained on fancy hosiery by formulas that require no more time than those used for ordinary dyeing methods.

I shall be glad to supply these formulas in detail to anyone interested, but briefly wish to state that the methods used are to eliminate the oils from the goods during the first thirty minutes of dyeing by dyeing the rayon and cotton yarns in a soap bath, then salting and adding the Celanese colors to the same dye bath during the last thirty minutes of dyeing. Where hard water is encountered sulphonated castor oil and soda ash are substituted for soap.

Where wool grease or excessively oily goods are encountered, the goods are given a pretreatment for twenty to thirty minutes with various proprietary products that have been found to emulsify wool grease and mineral oils. However, since the committee in charge of this meeting requested that no trade names be mentioned, I am not at liberty at this time to give the names of the several chemical firms that can supply these products.

In closing, I wish to say that the dyeing of fabrics made entirely of Celanese or the cross-dyeing of other fibers in the presence of Celanese is not intricate; it simply called for the development of special formulas; and now that these are available this type of dyeing can be accomplished as easily as the ordinary methods used for dyeing other fibers.

CARBOY HOLDER HAS NEW FEATURES

An improved safety carboy holder recently placed on the market is said to be adjustable to any size carboy within six seconds and to carry a weight up to 500 pounds; it is constructed of steel, weighs about 70 pounds and has a cradle which renders the holder adaptable for barrels, drums and large containers.

The safety carboy holder was invented for the purpose of providing those who handle carboys of dangerous acids or other chemicals with an inexpensive safety device that would take up only a small floor space and be practically indestructible. The new holder can be locked in draining position for use or in upright position when not in use. Interested parties can obtain further information by writing to the Reporter.

NEW STEAM-OPERATED CONTROLLER WATCHES TEMPERATURE IN PROCESSING

A new type of apparatus for automatically controlling the temperature of such processes as dyeing and bleaching that utilizes as a source of pressure the steam employed for the process itself has been developed in the laboratories of the C. J. Tagliabue Manufacturing Company, of Brooklyn.

Temperature and pressure controllers, regulators and thermostats have been made in many different forms, principally the self-operating type and the air-operated type. The latter has come into most general use where accurate temperature or pressure control is required.

Many plants, however, lack a supply of compressed air. Furthermore, the apparatus to be controlled is often located at some remote point to which compressed air could be supplied only at prohibitive expense. Hitherto, in such cases the self-operating type was used. In this type of controller changes of temperature at the bulb expand or contract a bellows or capsular spring which operates not against a small pilot valve but directly against the stem of the steam valve. The only power for closing the valve being generated by the bellows directly, it is impossible to close tightly the usual balance valve of the bevel seated or piston type. As a result, a small leakage of steam through the valve (even when in the closed position) cannot be avoided.

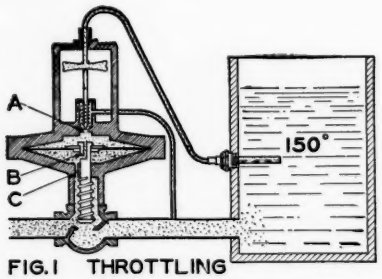


FIG. I THROTTLING

The steam-operated controller is simply a device which utilizes a portion of the steam which heats an apparatus to obtain enough power to work the valve the opening and closing of which governs the temperature of the apparatus where one best temperature must be maintained. Power is obtained without waste from the pressure of the steam. Variations in this pressure do not affect the accuracy of control, for the reason that it is not the entire pressure, but a differential pressure above and below a diaphragm, which is thus utilized.

Referring to the illustration, steam is always permitted to enter the diaphragm chamber through opening C whether the steam valve is open or shut. Also note that there is an opening B which connects the space above the diaphragm with the space below it. Steam can flow through this opening. If it is not allowed to escape at all from the upper portion of the diaphragm chamber, the steam pressure will be the same above and below the diaphragm, and there will be no force preventing the main spring from pushing down on the valve disc until it is closed, where it will stay closed because of the steam pressure above it.

When the steam is allowed to escape from the upper portion of the diaphragm chamber at exactly the same rate as that through which it passes from below to above the diaphragm, the differential will be just sufficient to counteract the main spring to an extent which will cause the steam valve to be "cracked" to an intermediate extent and will give throttling control.

With this general principle in mind, it is easy to see that "the opening A through which steam escapes from the upper portion of the diaphragm chamber" is an important opening, since its extent governs the opening, closing, or cracking of the steam valve. Since, in actual size, it is a tiny orifice, a pilot valve placed there requires an insignificant amount of force for its operation. Accordingly the instrument embodies a small pilot valve at this important orifice. This pilot valve is operated by a metallic bellows which forms a part of the usual thermostat system (sensitive bulb, connecting tube and bellows).

NEW EQUIPMENT FOR TEXTILE SCHOOL OF CAROLINA STATE COLLEGE

Special equipment has been obtained during the year for an additional research laboratory in the Textile School of the North Carolina State College that study and investigations can be made of fibers, starches and other materials used in textile manufacturing.

This equipment consists of the following: A photomicrographic outfit for taking microscopic pictures of starches, pastes, fibers, yarns, cloth, etc. A La Motte roulette comparator to determine the acidity or alkalinity of scouring, bleaching and sizing solutions. This apparatus is coming into general use in textile control work. The Kjeldahl apparatus for determining nitrogen contents of starches, cotton, etc. A Silverman illuminator, camera lucida and demonstrating ocular for use in microscopic examination of textiles.

An Alexander glue tester and a Scott viscosimeter, which are used for testing the viscosity of oils, starches and glue pastes, and a Cleveland oil tester for obtaining the flash and fire point of oils have been added to the laboratory apparatus, along with various microscopic accessories such as microtone, for obtaining cross-section of fibers, yarns and cloth, and an electric outfit for mixing and stirring solutions.

This additional laboratory is located on the first floor of the Textile Building so that it will be convenient to the dyehouse and laboratory. The regular research laboratory contains apparatus for testing all classes of yarns, fabrics and hosiery.

RECENT LITERATURE

Elimination of Waste, Simplified Practice: Hospital and Institutional Cotton Textiles. United States Department of Commerce.

In 1925 the American Hospital Association made a survey to determine the sizes of bedding then in use by various hospitals throughout the United States. From the replies of 452 hospitals a consolidated list of requirements was prepared. At the request of the association the Division of Simplified Practice sent this tentative list to more than a thousand hospitals, and the manufacturers and distributors of bedding materials were consulted. The result was the schedule of standard sizes enumerated in this booklet, which also contains a list of the institutions that have accepted the recommendation and an interesting preachment on simplified practice.

Bulletin of the Lowell Textile School—1928. 82 pages. Illustrated.

This bulletin, issued quarterly, is a complete prospectus of the technical and other courses of instruction offered by Lowell Textile School, with details of admission requirements, outlines of each course with pre-requisites, school term calendar, and lists of graduates and present students, officers and faculty. It is interestingly illustrated with photographs of various departments of the school, showing the equipment and operating rooms.

After June 19 the Lowell Textile School will be known as the Lowel Textile Institute, by legislative act of 1928.

Correspondence School Directory

A useful little booklet has been issued by the National Home Study Council of Washington, D. C., under the title of "Home Study Blue Book—A Directory of Approved Correspondence Courses."

A brief but readable introduction defines for the reader the meaning of home study to those who take advantage of it. Opinions of noted educators, business men and the press on the subject of home study are quoted. Names and addresses of thirty-five correspondence schools are listed, as well as some 250 subjects covered by their mail courses.

CELANESE PLANT ISSUES A MAGAZINE

The employees of the Celanese Corporation plant at Cumberland, Maryland, are now publishing an interesting little monthly organ entitled "Celanese Topics." The April number of the periodical, which is the first, contains articles on the new office building being erected at Amcelle, on the organization of the Celanese Athletic Association and on new uses for cellulose. The magazine is enlivened by a number of entertaining features and regular departments, illustrated by a staff cartoonist. Its purpose is, of course, to bring into closer and more helpful relations the employees of the rapidly growing Celanese factory at Amcelle.

COLLOID SYMPOSIUM AT CLEMSON COLLEGE

Theory Applied to Mill Problems in All-Day Session

A symposium on colloid matter, particularly as pertaining to textile chemistry, dyeing and related fields, was held at the Textile School of Clemson College, S. C., last Friday, April 27. Several nationally noted lecturers and research directors were featured on the program of this symposium.

Dr. Victor Cofman, consulting chemist to the Research Department of E. I. Du Pont de Nemours & Co., delivered a number of quite original and unusual addresses at the morning session of the meeting. His leading talk was entitled "The Fundamental Principles of Colloid Science." This was followed by an open discussion of all phases of the theory of matter in the colloidal state, such matter comprising a wide variety of natural and synthetic products and processes. A popular lecture by Dr. Cofman, following his outline of fundamental principles, discussed under the head of "The Stuff We Are Made Of" a number of the more human aspects of colloidal matter.

The afternoon session of the Colloid Symposium opened with a third address by Dr. Victor Cofman on "Colloids As a Fourth Estate of Matter" in which the speaker discussed the most recent discoveries and theories of colloidal chemistry. A second feature of this session was a paper on The Application of Dyestuffs to Cotton by Dr. R. E. Rose, Director of the Technical Laboratory of the Du Pont company.

A Phi Psi dinner was arranged in honor of the speakers in the evening and this was attended jointly by the Greenville Alumni Chapter and the Iota Chapter of the textile fraternity. A. R. Thompson, president of the Phi Psi and A. W. Smith Jr., chairman of the Greenville Chapter, presided.

The symposium was brought to a close after dinner by the presentation of three more technical papers by the speakers; the first by Dr. Rose on "The Vat Dyes and Their Application to Cotton"; the second by Paul Haddock on "The Finishing of Cotton Goods"; the third by Dr. Cofman on "The Methods of Colloid Study Applied to Textile Chemistry." Dr. Cofman's paper was placed last in order that he could discuss from the standpoint of colloidal theory the various phases of dyeing and finishing covered by the preceding speakers.

The Clemson Colloid Symposium was opened freely to all who were interested in the newer advances in col-

loidal chemistry, and a special appeal was made to mill superintendents, dyers, finishers and textile chemists of the district, who were urged in advance to bring with them any number of practical mill problems for discussion. The purpose of the symposium was to bring out the practical applications of colloidal theory to practical mill processing.

RISE OF NORTH CAROLINA'S TEXTILE INDUSTRY TOLD

Thomas Nelson, dean of the Textile School of North Carolina State College, delivered an address on "The Development of the North Carolina Textile Industry" at the Industrial Institute conducted by the Eastern Carolina Chamber of Commerce during the Eastern Carolina Exposition at Goldsboro. He traced the history of this industry from the time that Michael Schenck and Absalom Warlick built the first North Carolina cotton mill at Lincolnton in 1813 to the present date. Stating that the textile industry would continue to expand along the lines of fine yarns, fancy weaving, designing, dyeing and finishing, he pointed out that it offers exceptional opportunities to young men who have been thoroughly trained in the science and practice of textile manufacturing.

LARGE NEW RAYON CORPORATION

Formed by Merger of Franklin Dyeing Company and Special Yarns Corporation

The Franklin Rayon Corporation has been incorporated under the laws of Rhode Island as of April 17, 1928, issuing 5,000 shares of first preferred stock, 5,000 shares of second preferred stock, and 30,000 shares of common stock. This new corporation is a result of a merger of the Franklin Rayon Dyeing Company of Providence and the Special Yarns Corporation of South Boston. The new corporation will also control and operate The Carolina Dyeing & Winding Company of Mount Holly, N. C., and will likewise have a close working arrangement with the Rayon Department of the Southern Franklin Process Company of Greenville, S. C.

The new organization will have every facility for dyeing rayon by every known method, and will dye and sell rayon in any converted form including skeins, tubes, cones, spools, cops, or warps. It will also do commission dyeing and will serve the cotton weaving, woolen and worsted, knitting and hosiery, underwear, silk weaving, lace manufacturing, narrow fabric, knitted outer wear, braiding and insulated wire trades. The total combined capacity of the four plants will be 60,000 lbs. a week. The winding and twisting capacity of the four plants will be about 40,000 lbs. a week.

The new corporation will sell rayon warps, and will specialize in spool to spool sizing for small end warps.

The South Boston plant will continue to operate as the Special Yarns Division of the Franklin Rayon Corporation, and will continue to furnish decorating yarns to the woolen and worsted trade.

The main office of the corporation will be in Providence. There will be representatives of the corporation at all four plants, and there will also be representatives at the following addresses: 66 Leonard Street, New York City; Adams & Franklin Building, Chicago, Ill.; Hope and Clearfield Streets, Philadelphia, and Chattanooga, Tenn.

BULK OF DYES USED IN CHINA IMPORTED

Shanghai, China.—A local journal gives the information that there are now thirty dyestuff dealers operating in Tientsin, China, chiefly importing foreign dyestuffs. Consumption of Chinese dyestuffs, it is generally said, hardly exceeds one-tenth those of imported colors. The bulk of imported dyestuffs is from Germany, although the United States, Japan and England contribute quotas.

Among the Japanese and English dyestuffs consumed in Tientsin, blue vitriol is most popular. Japan ships to Tientsin large quantities of bleaching powder. Some of the dyestuff dealers also sell varnish and oil paint of domestic production. In preparing colored paint and varnish the dealers sometimes use Chinese pigment to the extent of 30 per cent of the total amount.

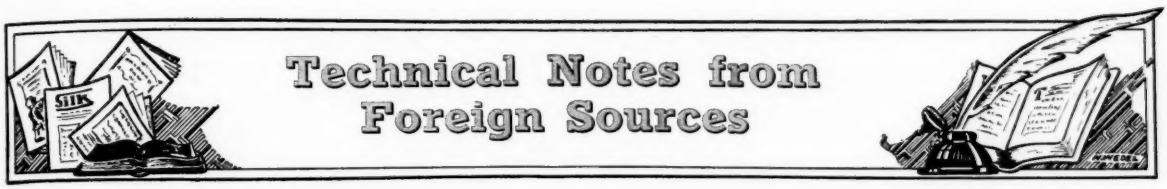
Another interesting item of information to the American dye industry is that the Industrial Commissioner of Fengtien province, Manchuria, has instructed the county magistrates in the province to encourage the cultivation of indigo by farmers. This plant is not extensively grown in Manchuria, which has so far depended on foreign manufacturers for the supply of dyestuffs.

SILK EXCHANGE IDEA STUDIED

"Before appointing a committee to make recommendations on the subject of a silk exchange for the New York market, the Silk Association of America, Inc., will await the report of the committee appointed by the New York Cotton Exchange, who have been engaged for some time in thoroughly investigating the question of a silk exchange," said H. Schniewind, Jr., president of the Silk Association, last week.

"This court of action was determined at a meeting of the executive committee of the association held some time ago at which it was agreed that, as the New York Cotton Exchange had, before coming to any conclusion on the subject of a silk exchange, courteously offered to make a comprehensive study of the subject, it was not necessary for the Silk Association to appoint a committee at that time."

If it seems advisable in the best interests of the silk industry, after the report of the Cotton Exchange has been presented, to make further investigation on the subject of a silk exchange, a committee no doubt will be appointed for that purpose, Mr. Schniewind said.



Vat Dyes—Non-Caustic Bath

J. W. Leitch & Co., Ltd., A. E. Everest and J. A. Walwork; English Patent No. 274,550.—The hydrosulphite bath is made up with an alkaline salt of a higher fatty acid, such as stearin soap, together with sodium carbonate or ammonia, or both. The bath can be used at a higher temperature than is possible when caustic is used, without injury to the fiber. Examples are also given of the preparation of concentrated stock vats which can be preserved for some time; thus, one made up with stearine soap, ammonia, Indigo paste and hydrosulphite can be prepared in paste form; or, by omitting the hydrosulphite and replacing the ammonia by soda ash, the mixture solidifies on cooling, and can be cut up into blocks and kept till needed. Either indigoid or anthraquinonoid dyestuffs can be used.

Mordants for Fixing Basic Dyestuffs on Cotton

A. Thauss and A. Guenther (*I. G. Farben-Ind. A. G., Frankfort-on-Main*); *D. R. Patent No.* 446,219 (*addition to D. R. Patent No.* 348,530).—Mordants are prepared through the action of sulphur chloride upon phenols and subsequent simultaneous action of oxidizing agents and alkaline bisulphites upon the products obtained. These mordants may be used in neutral or acetic acid solution, which is of importance for dyeing of union goods.

Preservable Mixtures for Preparation of Diazo Baths

K. Schnitzspahn (*I. G. Farben-Ind. A. G., Frankfort-on Main*); *D. R. Patent No.* 447,069.—A dry, neutral, mineral-acid salt of nitrated aromatic amines, capable of diazotization, is mixed with suitable dry dilution agents (e. g., calcined Glauber salt) and nitrites of the alkali metals. These mixtures, on being stirred into cold, dilute mineral acids, give diazo solutions ready for use.

Cellulose Ester Solvents and Softeners

A. Noll, Papier-Fabrikant 1927, 25, 497-501.—The constitution and properties of the following solvents and softeners for nitro-cellulose, celluloid, cellulose acetate, etc., are given: Methyl and ethyl glycol and their acetates, diethyl and ethyl-butyl carbonates, the methyl and ethyl glycol esters of phthalic acid (Softeners PA and PM), diphenylmethane, diphenyl ether, benzyl alcohol (Plastoform I), n-phenyl-methyl alcohol (Plastoform II), phenyl-methyl ketone (AHN), benzyl acetate (Plastolin I), amyl salicylate (Plastolin II), the phenyl ester of p-toluene-sulphonic acid (PO), and 2-3-hydroxynaphthoic anilide (P II).

Properties of Cellulose Ethyl Ether

K. Hess and A. Mueller, Annalen 1927, 455, 205-214.—By use of diethyl sulphate and alkali, H. and M. have prepared a triethyl-cellulose, the properties of which, from different cellulose sources, are the same. Slow evaporation of dilute benzene solutions gives the substance in crystalline form (fine grouped or discreet needles, of which photomicrographs are given). Precipitated from solution —e. g., from acetic acid—by the addition of water or alcohol, it separates in amorphous flakes. By cooling hot solutions in amyl acetate, cyclohexanone, etc., it separates in a gelatinous form. It is insoluble in cold or warm water, and its solutions in chloroform, glacial acetic acid, benzene and pyridine show rather high positive rotation.

Cellulose Acetates—Cryoscopic Properties and Constitution

K. Hess and G. Schultze, Annalen 1927, 455, 81-103.—Certain acetates of cellulose prepared from ramie have been prepared in the amorphous form and studied comparatively to similar compounds of crystalline structure. The conclusion is reached that they possess the same internal structure. A paper of interest to cellulose research workers.

Cellulose Acetate—X-ray Structure

W. Jancke, Kolloid-Zeit. 1927, 42, 186-187.—Of interest to cellulose research workers.

Azo Dyestuffs

Fabrique de Prod. Chim. Rohner Soc. Anon., Pratteln, Pratteln, Switzerland; English Patent No. 275,147.—Monoazo dyes are produced by coupling diazotized oxamic acids of the diamino-diphenyl (benzidine) series to aromatic mono-amines and saponifying with alkali. The diamino mono-azo dyestuffs thus formed can be tetrazotized and coupled with the arylides of 2-3-hydroxynaphthoic acid, either in substance or on the fiber, giving black trisazo dyestuffs, which are in substance valuable pigment colors. As an example of production of a dyestuff on the fiber, cotton in fiber or fabric is padded with 2-3-hydroxynaphthoic anilide and developed with the tetrazotized dyestuff formed from dianisidine and alpha-naphthylamine.

Azo Dyeing of Cellulose Esters

I. G. Farben-Ind. A. G., Frankfort-on-Main; English Patent No. 275,230.—The esters and ethers of cellulose may be dyed in yellow shades by dyestuffs of the general

type obtained by condensing a nitro- or dinitro-chlorbenzene-sulphonic acid with an amino-azo dyestuff or by condensing a mono- or dinitro-chlorbenzene with a mono-sulphonated amino-azo dyestuff. Other groups may also be present, but at least one sulpho-group, and at least one nitro-group on the diaryl complex, must be present.

Dyeing of Acetate Silk

O. Y. Imray (I. G. Farben-Ind. A. G., Frankfort-on-Main); English Patent No. 275,307.—Acetate silk may be dyed with mono-azo dyestuffs obtained by coupling a diazotized amino-naphthoic acid with a second component or by coupling an unsulphonated diazo-compound with an amino-naphthoic acid. The dyestuffs may be applied as usual (in substance or from bath) or by the padding-development process. Those dyestuffs which contain a free amino-group may be further diazotized on the fiber and developed with a suitable component.

Acetate Silk Dyeing with Vat Dyes

Durand and Huguenin Soc. Anon.; English Patent No. 274,094.—Acetate silk, or a fabric containing it, is dyed or printed with an ester salt of a leuco vat dyestuff, then steamed and developed at a high temperature with an oxidizing agent, such as a nitrite or dichromate, plus sulpluric acid. Solid shades are thus obtained on mixed goods. If the mixed fabric is washed after steaming, the ester salt is removed from the cotton, and this remains white on subsequent oxidation. The ester salt of leuco-tetrabromindigo is particularly recommended for this process. If a mixed fabric is padded and then, without steaming, developed as above for a short time at a low temperature, only the cotton is dyed.

Azo Dyes by Development

I. G. Farben-Ind. A. G., Frankfort-on-Main; English Patent No. 274,128.—The padding compound is one of the Naphthol AS series, the ones cited being the 4-chlor-2-toluidide, the alpha-naphthalide, the 5-chlor-2-anisidide and the beta-naphthalide of 2-2-hydroxynaphthoic acid. The developers used are 1-3-dimethyl-4-amino-6-chlor (or -brom)-benzene(6-halogenated meta-xylidine) and 1-3-dimethyl-4-amino-2-6-dichlor (or -fibrom)-benzene.

Discharge Printing with Vat Dyes

J. S. Wilson, J. Thomas and Scottish Dyes, Ltd.; English Patent No. 274,178.—The fabric is dyed with a mixture of two or more vat dyestuffs, of which at least one can be discharged with a reducing agent in mixture with leucotrope, while at least one is not thus dischargeable. It is then printed with a suitable discharge paste, yielding a two-color effect. As examples of dyes not dischargeable as above are mentioned Caledon Brilliant Purple RR, Caledon Jade Green, Caledon Blue R and Caledon Gold Orange G. Suitable dischargeable dyestuffs are Caledon Red BN, Caledon Blue 3RK, Caledon Olive R, Caledon Yellow 3G and Caledon Violet R.

Vat Dyes—Application of Flavanthrone

B. Wylam, J. E. G. Harris, J. Thomas and Scottish Dyes, Ltd.; English Patent No. 274,303.—Leuco-flavanthrone treated with chlorsulphonic acid in the presence of a tertiary base (in the example given pyridine is used) gives reddish compounds which when dissolved in weak alkalies, such as sodium carbonate, can be dyed or printed upon cotton or other material, and the flavanthrone developed by hydrolysis and oxidation. Equal mols of chlor-sulphonic acid and tertiary base apparently are involved, but better results are obtained if more base is used than in the 1-1 proportion.

Estimation of Oils in Textiles

H. R. Hirst, J. Text. Inst., 1927, 18, *T* 606-607.—The usual method of extraction with ether, in a Soxhlet apparatus, is inconvenient on account of the need of watching and the danger of fire; further, when oxidized oils are present, the other method may bring about oxidation of the unoxidized oils. H. recommends cold extraction with acetone. Twelve to twenty g. of the material are cut up finely and covered with 200 c.c. of dry acetone in a wide-mouthed bottle with well-ground stopper and allowed to stand twenty-four hours with occasional shaking. One hundred c.c. of the liquid are then withdrawn, filtered if necessary, evaporated to dryness in a weighted bottle (in a stream of CO_2 if advisable) cooled in a desiccater and weighed in. The weight multiplied by 2 gives the total oil in the sample. An example is given, indicating that the acetone method gives somewhat more accurate results, in addition to its greater convenience, than does the customary ether method (99.6% as against 98.5%). If potassium oleate or any similar soap is present, the residue after weighing should be shaken with water and titrated with N/10 sulphuric acid, using Brom-phenol Blue as indicator. Recovered acetone should be distilled over calcium chloride, and is then suitable for use again.

Mercerization of Cellulose Acetate-Cotton Fabrics

Calico Printers' Association, L. A. Lantz and C. M. Keyworth; English Patent No. 273,830.—Mixed weaves containing cotton and acetate silk can be mercerized in the usual manner with caustic if the fabric is pretreated with some (liquid) substances which are insoluble in the strength of mercerizing bath employed, and which at the same time either prevent or retard saponification of the cellulose ester component. Suitable substances are benzene and its homologues, chlor- and o-dichlorbenzene, nitrobenzene, mono- or di-methylaniline, hydrogenated phenols or hydrogenated naphthalenes, petroleum distillates, and essential oils. As examples are cited dekahydronaphthalene and ordinary gasoline. The protective liquid may be previously applied or simply floated upon the surface of the mercerizing bath.

Developed Azo Dyes

W. Carpmael (I. G. Farben. Ind. A. G., Frankfurt-on-Main); English Patent No. 275,326.—Covers the use of

hydroxy-naphthocarbazoles and hydroxy-dinaphthocarbazoles and their derivatives as padding agents for developed colors in printing or dyeing from bath. The dyeings are fast to washing, scouring and chlorine.

ANNUAL KNITTING ARTS SHOW SETS NEW RECORD FOR INTEREST AND ATTENDANCE

Much New Equipment Featured in Largest Exhibition on Record

Acclaimed by the industry as one of the liveliest and most important textile shows of the year, the Twenty-fourth Annual Knitting Arts Exhibition, held in the Commercial Museum, Philadelphia, during the week of April 16, attracted an even larger attendance than in former years. With every square foot of display space in the expansive museum hall occupied, this year's exhibition was considerably larger than any of its noted predecessors.

The annual convention of the National Association of Hosiery & Underwear Manufacturers was held during the week of the show and was confined to a single session, followed by the regular annual luncheon, both meeting and luncheon being held in the exhibition hall.

The manufacturers of knitting machinery and other mill equipment went to greater lengths than ever before to stage a show that would fully justify the large attendance of mill men anticipated. When the doors of the exhibition were opened at noon on the first day most of the large and important machinery exhibits were whirring their annual song of welcome to the trade. Innumerable new developments in knitting machines, mechanical devices and plant supplies were featured in the 350 displays that comprised the exhibition. The equipment on display represented all types of hosiery, underwear and outerwear knitting machines, processing apparatus, such as dyeing, finishing extracting and drying machinery, and numerous pieces of smaller apparatus. There were in addition, as usual, many interesting exhibits of dyestuffs, chemical specialties, and cotton and rayon yarns.

Among the dyestuff manufacturers represented, the display of E. I. du Pont de Nemours & Co. came in for a considerable share of attention. The range of Du Pont dyes was uniquely depicted by means of a large pipe organ with colored glass pipes, the music for which was furnished by means of a concealed radio. Samples were displayed of various kinds of knitted wear dyed with Du Pont colors. A. Klipstein & Co. were represented with a display made up of a colorful array of piece goods, hosiery and other knitted wear that had been processed with Klipstein chemical products and dyestuffs. The exhibit of the Sandoz Chemical Works, Inc., also consisted of a brilliant display of knitted apparel dyed with Sandoz colors and of interesting samples of new textile specialties for processing. Jars of Hydroxy oils, softeners and other special products as well as textile goods that had been processed with Kali products were shown by the Kali Manufacturing Company of Philadelphia. Oakite Products, Inc., displayed samples of cotton hosiery and underwear tubing that had been kier boiled with Oakite, as well as a pretty collection of rayon apparel de-oiled with that product.

The dyeing and other processing machinery manufacturers naturally attracted crowds to their exhibits during the week of the show because most of their equipment was displayed in operation. An entire battery of rotary hosiery dyeing machines as well as the five-reel hydraulic skein dyeing machine were set up in the space occupied by Smith, Drum & Company of Philadelphia. The Tolhurst Machine Works, of Troy, N. Y., exhibited one of their extractors equipped with newly developed safety and timing devices. A model of the Permutit zeolite water softener was featured at the exhibit of the Permutit Company of New York. One of the most interesting displays for dyers was that of the International Nickel Company, where numerous Monel metal products were featured, with special emphasis on the wide application of Monel metal in the dyeing equipment shown elsewhere in the exhibition.

PRATT ALUMNI CHEMISTS DINE AND FROLIC

A real lively, rollicking old-timer's party was the Twenty-ninth annual dinner of the Pratt Institute Chemical Alumni Association, held at the Hotel McAlpin on the evening of April 19. Those who attended found themselves in the midst of one of the largest and most socially enjoyable gatherings of Pratt chemists that has been seen at an annual dinner in some time. They found the spirit of good fellowship expressed in their meetings with old classmates and friends and they found both fellowship and inspiration in the many excellent after-dinner addresses, which, unlike most speeches of that kind, will be remembered as more than ordinary features of this year's dinner.

Frank Wyant, Jr., presided at the board as toastmaster and introduced the guests of honor with apt and characteristic humor. Dr. Frank L. Babbott, Jr., delivered the opening speech on "The Institute." He was followed by Richard H. Lersner, who spoke on "Chemistry as Applied to Commercial Business." Dr. Charles M. Allen, head of the Chemistry Department of the Institute, took "School Topics" for the subject of his entertaining talk and James A. Branegan, president of the Kali Manufacturing Company, drew some deservedly violent applause with his address on "How Pratt Institute Has Influenced My Life." Another outbreak of appreciation greeted Dr. Allen Rogers' intimate talk on "Chemistry in the Pleasures of Life." A closing address by Samuel S. Edmands, Director of the School of Science and Technology, terminated the evening's more formal program, and six acts of cabaret and entertainment brought the enjoyable affair to a happy end.

DU PONT DEVELOPS ANOTHER ORANGE

A direct orange dyestuff has been developed and placed on the market by the Dyestuffs Department of E. I. du Pont de Nemours & Co., under the name of Pontamine Light Orange 2G. Its outstanding feature is said to be its exceedingly good fastness to light, in which respect, it is claimed, the color compares very favorably with vat oranges. In addition the general fastness properties are described as very good for a direct color.

Pontamine Light Orange 2G discharges to a clear white with Sulfoxite C and will find use on cotton piece goods for this purpose. The color is described as suitable for all padded shades on cotton either straight or in combination with fast direct colors.

BLUE BLACK FOR WOOL

Dyers of wool will be interested in an entirely new type of color placed on the market recently by National Aniline & Chemical Company, Inc. under the brand name of "National Alizarine Blue Black BG. This dye is said to be valuable for the production of slates and grays described as of good fastness to light and fulling. The color is, according to the announcement, unaffected by Monel metal and copper and can be dyed in iron, although the shade turns somewhat yellower and duller.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF AMERICAN DYESTUFF REPORTER.

Published biweekly at New York, N. Y., for April 1, 1928.

State of New York, County of New York, s.s.:

Before me, a notary public in and for the State and county aforesaid, personally appeared Alfred P. Howes, who, having been duly sworn according to law, deposes and says that he is the publisher of the American Dyestuff Reporter, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 445, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:

Publisher—Alfred P. Howes, 90 William Street, New York City. Editor—Louis A. Olney, Lowell, Mass. Managing Editor—Clayton Hoagland, 90 William Street, New Yo.k City. Business Manager—Alfred P. Howes, 90 William Street, New York City.

2. That the owner is: Howes Publishing Company, Inc., 90 William Street, New York City; Alfred P. Howes, 90 William Street, New York City; Mary K. Howes, Rutherford, N. J.; J. T. Howes, Rutherford, N. J.; D. C. Howes, Rutherford, N. J.; Louis A. Olney, Lowell, Mass.; William F. Collins, Upper Montclair, N. J.; Derfla H. Collins, Upper Montclair, N. J.; William H. Collins, Upper Montclair, N. J.; Joseph L. Schroeder, Hartsdale, N. Y.; N. H. Hiller, Carbondale, Pa.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of totai amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

Alfred P. Howes, Publisher.

Sworn to and subscribed before me this 31st day of March, 1928.

[Seal] Caroline Essenbreis,
Notary Public, Kings County, N. Y.
(My commission expires March 30, 1929.)

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i. e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

TEXTILE CHEMIST

Young textile chemist; four years' experience in testing and service laboratory of dyestuff house, two years' practical experience on cotton piece goods on jigs and pads. Able and willing to assume responsibility and possesses initiative; seeks position as chemist or dyer with good chances for advancement. Address: Classified Box 456, American Dyestuff Reporter.

PRINT WORKS MAN

Young man desires a position in a color shop or laboratory. Experienced print works man. Graduate of textile school. References. Address: Classified Box 458, American Dyestuff Reporter.

EXPERIENCED DYER

Dyer with more than twenty years' experience on woolens, worsteds, rayons and cottons, all forms, seeks position as overseer of dyeing. Highly recommended. Address: Classified Box 460, American Dyestuff Reporter.

DYER ON WOOLENS

Dyer, expert on woolen and worsted piece goods and slubbing, will consider position where his twenty years' experience can be used in real production. Address: Classified Box 461, American Dyestuff Reporter.

SALESMEN WANTED

Manufacturer of a full line of dyestuffs, oils and specialties has an opening for one or two experienced salesmen. Salary and commission. State full particulars. Address: Classified Box 459, American Dyestuff Reporter.

FOR SALE LEASE OR EXCHANGE PLOT 100 BY 100 FEET

Four-story brick fireproof building; boiler, elevator; also one-story garage, yard space; unrestricted zone, near railroad and water; good labor; Wallabout Market section, Brooklyn. Ideal for dyeing or chemical plant. Owner, Louis Jacobs, 315 Central Park West, New York City. Telephone Riverside 7035.